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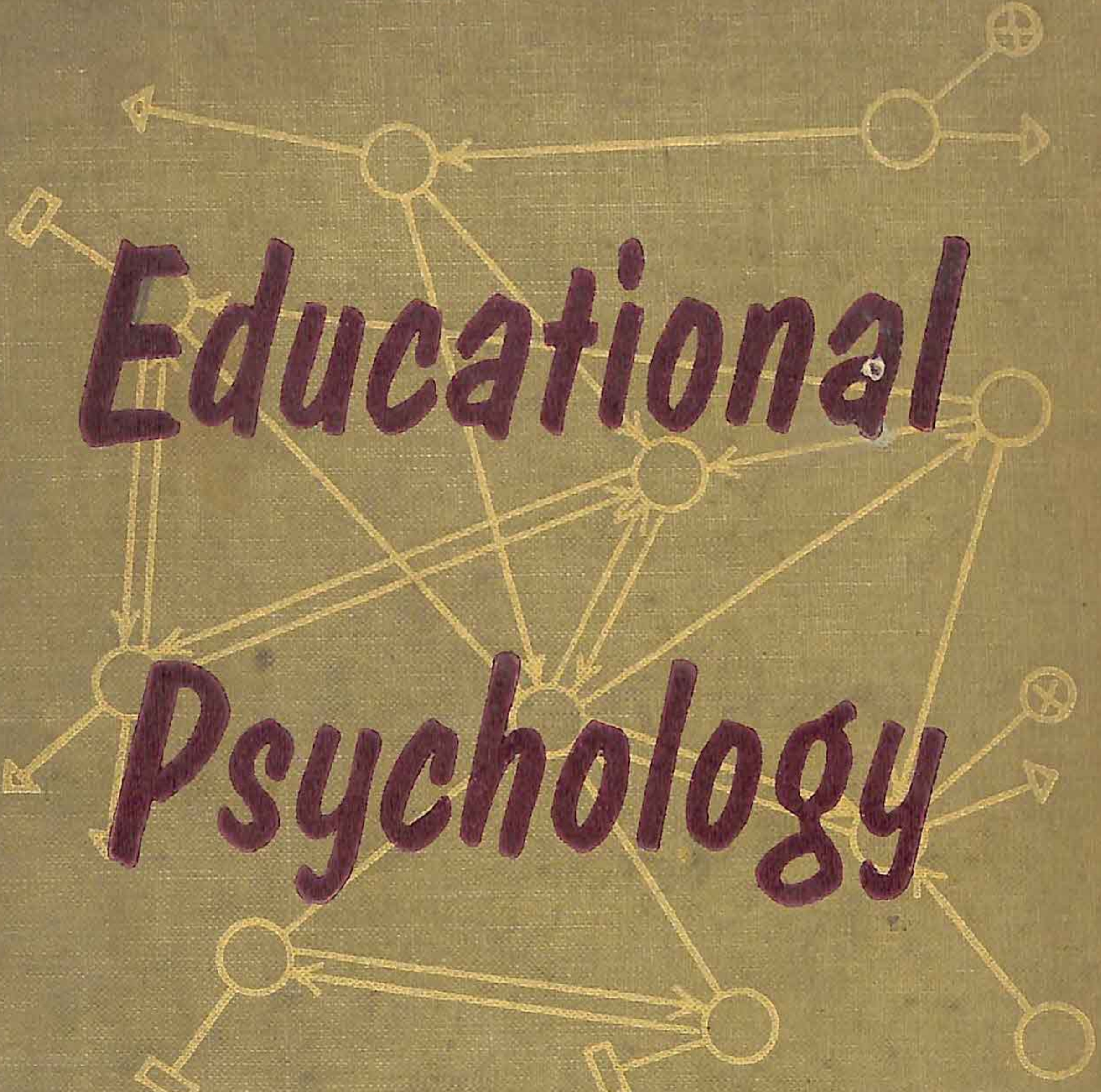
Educational Psychology



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PREFACE

THIS VOLUME is an outgrowth of many years of study and experimentation by the authors in problems and methods of teaching in the general area of education and psychology. It is a result of careful selection and critical analysis of materials from the studies conducted during the past several decades on problems in educational psychology.

Educational psychology is regarded as an aspect of applied psychology. Its development has been marked by certain outstanding trends, which may be listed as (1) greater dependence upon scientific data, (2) increased application of findings to learning situations, (3) an increased emphasis upon the growth of the individual child as a unified whole, and (4) a more general recognition of the dynamic nature of the individual. These trends appear as a fundamental part of the materials of this text.

The text is designed as the foundation or basic course for students preparing to teach. Its emphasis upon growth and learning should provide the student of education with a background of understandings essential for his professional growth. In this connection the writers propose to give the student an understanding of the roles of maturation and learning in the growth and development of the individual child.

The student is introduced to the meaning, purpose, and scope of educational psychology in Chapter 1. This chapter also furnishes a brief description of the methods used in studying problems that fall within the scope of the subject. A brief description of the materials covered in the chapters comprising the two major areas of the text, presented in Chapter 1, should give the student an orientation to the field as a whole. The instructor may also find it useful to discuss with the students the chapter titles as given in the Table of Contents.

Each chapter contains a list of selected readings intended to supplement the materials of the particular chapter. This should help the instructor guide the students in further research. Special study questions and exercises are also found at the end of each chapter. These exercises have in most cases been tried out in various classes and found useful in directing the thinking and studying of students. A *Workbook in Educational Psychology* has been prepared to accompany the text. This contains self-testing exercises and special problems that have been developed and tried out for each chapter of the text.

How the materials of this textbook are used will depend largely upon the philosophy, methods of teaching, and goals of the instructor. The writers' long experiences as teachers in public schools, colleges, and universities have led them to realize that good teaching depends largely upon desirable teacher-student relations. However, a sound and usable textbook with supplementary materials will be most beneficial in the hands of a good teacher. This volume is designed to enhance good teaching and learning in educational psychology courses.

The writers are indebted to those authors and publishers from whom materials were secured for this textbook. Acknowledgments have been made to each of these in the footnote references. To others who have contributed either directly or indirectly to the production of this volume, the writers are grateful.

University of Georgia

K. C. G.
J. S. G.

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Educational Psychology

CHAPTER 1

The Field of Educational Psychology

AT BIRTH the child brings his biological inheritance with him into this world. Characteristics of his biological heredity are not sufficient in themselves to enable him to live harmoniously in a social culture such as ours. An important task of the school is to assist the learner in meeting or discovering his cultural heritage. It is through the guidance of children in growth and development that they acquire skills, information, understanding, concepts, and attitudes concerning their social heritage. However, much of the acquisition of the social heritage is informal in nature. Furthermore, much of the child's education takes place outside the supervision and direction of the schools.

Although the school is only one of a number of forces which affect the child's educational development, it has always been concerned with the teaching of certain aspects of the social heritage to growing boys and girls. Throughout the history of education, scholars have set forth challenging theories and viewpoints on the problems of growth and learning. The beginnings of educational psychology are to be found within these.

THE SCOPE OF EDUCATIONAL PSYCHOLOGY

Psychology, conceived of as the *science of behavior,* is concerned with the study of man wherever he may be found. It is no longer confined to the laboratory. As an applied science it deals with human behavior in industrial situations, in business situations, in social situations, in educational situations, and in whatever other situations such behavior is involved. Educational psychology may be regarded as psychology applied to human behavior in educational situations.

Aims of educational psychology. Since the adoption of the scientific method in psychology, a large body of knowledge has been assembled. This has led to the development of an increased understanding of problems in the realm of educational psychology. As a result of studies in this field there have emerged certain principles which have been found effective in child development and learning. And, although educational psychology is a relatively new science, its aims and content have become fairly well defined. The aims of educational psychology have been expressed in a committee report as follows:

> Educational psychology is concerned primarily with the study of human behavior as it is changed or directed under the social process of education, and secondarily with those studies of processes that contribute to an increased understanding of how behavior is changed and directed through education.[1]

The past few years have seen a progressive refinement of techniques, both experimental and statistical, employed in educational psychology and related fields. These developments have been instrumental in the growth of educational psychology as a science and in the enlargement of the interests of educational psychologists to include a broader category of problems. The educational psychologist is concerned with learning problems of two general classifications: the immediately practical and the systematic.[2] His studies of a practical nature involve the task of verifying theories and the results of laboratory experiments in actual situations, such as in the classroom. His second obligation is to the total field of scientific knowledge. He seeks to collect data on the learning involved in educational situations and to study the characteristics of such data in terms of their place and use in increasing scientific knowledge about the general characteristics of learning and development.

Subject matter of educational psychology. J. McKeen Cattell, one of the early American pioneers in psychology, once made the statement: "Psychology is what psychologists do." This type of definition should help in characterizing educational psychology. During the early part of the present century, students of educational psychology were concerned with exploring the entire area of the psychological problems of education. By 1920 the scope of educational psychology was beginning to assume a fairly definite form. Its boundaries have, however, continued to change with the acquisition of new concepts and tools in the field and because of modifications in the objectives of education. The range of educational psychology is generally limited to a study of human behavior in educational situations; but there has been a distinct trend toward including more material bearing on growth and development during the preschool and school years. This may be observed from an analysis of the content of recent textbooks in educational psychology. A study by Blair showed that the books differ considerably in their emphasis upon various topics.[3] Some variation is to be expected and is not harmful as long as the student is given a unified and well-integrated body of content dealing with psychological problems of growth and learning that will be useful to him as a student of education.

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[1] Victor H. Noll, John B. Horrocks, and G. Lester Anderson, "The Function of the Division of Educational Psychology of the American Psychological Association: A Committee Report," *Journal of Educational Psychology*, Vol. 40 (1948), pp. 361-370.

[2] See J. B. Stroud, "Experiments in Learning in School Situations," *Psychological Bulletin*, Vol. 37 (1940), pp. 777-807. A condensed review of 256 studies of learning in school situations is here presented.

The subject matter in this text is organized around two closely related topics:

Growth and Development
Learning and Guidance

Changed concepts of the nature and purpose of education have brought about an increased interest in understanding growth and development. The modern teacher recognizes that the whole child goes to school, the whole child responds to the school environment, and the whole child learns. The great amount of research in child development has had important implications for the teacher and others concerned with the educational program. In the first place, these studies reveal that the child grows as a whole—that physical growth is closely related to social, emotional, and mental growth. Although the subject matter of Part One of this volume deals with different aspects of growth, it is constantly emphasized that the child grows and develops as a closely related whole. The student of education is presented with principles of growth and development. These principles are further revealed in the discussions of physical, emotional, mental, and social growth. The chapter dealing with the nature and measurement of intelligence furnishes the student with information about intelligence tests designed for different age levels and conditions and factors which affect a child's intelligence. The child's intelligence is expressed in many ways. The method of expressing his mental ability has an important bearing on his growth and learning. The emphasis in Part One upon social growth, character formation, personality development and adjustment gives a new orientation to the problem of education in relation to child growth.

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[3] Glenn M. Blair, "The Content of Educational Psychology," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 267-274.

Part Two deals with learning and guidance. Learning and development are completely interwoven in the education and growth of the child. Experiments on problems of learning have furnished valuable information to students who are concerned with their own learning problems as well as with directing the learning of others.

The present-day teacher is more than one who tries to teach the 3 R's and a body of knowledge. He is concerned with stimulating and directing the personal and social development of others. Scientific studies in educational psychology have revealed that some guidance techniques are more desirable than others. These studies have also furnished useful information about child and group dynamics, and are having important effects upon the total school program. The learning process is not something of an intangible nature detached from individuals. The emphasis of the modern school is upon the individual pupil; although the pupil cannot be understood apart from his past and present environments. The term guidance has taken on a new and enlarged meaning as a result of studies of child development and learning. Teaching and guidance are clearly interrelated in a modern school program.

The overlapping of the content of educational psychology with general psychology, child and adolescent psychology, and other related areas of study is inevitable and is, up to a certain point, desirable. Educational psychology must continue to draw from these fields and must go further to show how the findings from research and theoretical psychology can contribute to the solution of educational problems. Thus, the orientation and general direction of the content of educational psychology should gratify the needs of teachers and others especially concerned with the guidance and direction of the growth and development of learners. This in the final analysis becomes the end and goal of educational psychology.

THE METHODS OF EDUCATIONAL PSYCHOLOGY

Educational psychology as a science. Educational psychology as a science concerned with studying problems of growth and development, learning, evaluation, and guidance did not suddenly spring into complete functional existence as did Minerva, the Goddess of Wisdom. It evolved over a long period of time, gradually developing, first from philosophy and then from the field of psychology.

It has already been suggested that educational psychology is especially concerned with studying individuals in educational situations. Since both

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In educational psychology students learn that growth and learning are enhanced by a favorable classroom situation

the individual and his educational environment are constantly changing, it becomes well-nigh impossible to make of educational psychology a pure science. No science, however, is completely free from changing conditions. Thus, a science in terms of exactness is *relative* rather than *absolute* in nature.

The goals of all science are the same—understanding, prediction, and control. These are also the goals of psychology and educational psychology. The student of educational psychology will be taught certain facts and principles about growth and development, the learning process, and personality development and guidance. These facts should enable him to understand children better, to predict the outcome of different learning experiences, and to direct and control the educational growth of boys and girls more wisely.

Furthermore, there are similarities in the methods of work in all sciences. The individual, confronted with a problem in educational psychology will depend upon precision, objectivity, controlled observations, and freedom from bias in the same manner as the individual seeking solutions for problems in geology, physics, or other sciences. There are different ways of studying difficult problems in educational psychology. The method used by the educational psychologist studying a particular problem will depend upon the nature of the problem involved and the training and insight of the investigator. Some of the most widely used methods will be described in the following discussions.

The experimental method. The experimental method was introduced in early psychological studies in an attempt to make psychology an exact science. This method attempts to answer a question or solve a problem by carefully testing it out. In physics, to solve the problem of speed of sound, careful time measurements must be made. To determine the effect of a particular type of fertilization upon the growth of roses carefully controlled agricultural experiments must be carried out. This type of experiment has been generally regarded as the most accurate method of arriving at the solution of psychological problems. However, there are many types of problems for which this method is not suitable.

Two general types of experimental methods are used in studying problems in educational psychology: the *single group* and the *parallel group*. The former method studies a single individual or group of individuals under laboratory or controlled conditions. For example, if we wish to study the eye movement of third-grade children while they are reading, it would be necessary to place a mirror at some distance from the child's eyes. The experimentor would then note the eye movements in the mirror while the child reads from a book held just below the mirror. Other educational problems that could be studied by this method include:

1. The effect of distraction upon the nature of the learning curve.
2. The effect of continued study upon blood pressure.
3. The fluctuation of attention under given conditions.

The parallel group method makes use of two or more groups in studying a problem. The groups (parallel) should be equivalent except for the factor which is being studied. Problems in educational psychology that may be studied by this procedure include:

1. The relative effects of kindergarten experiences on the intelligence of children.
2. A comparison of the effects of the laboratory method and the lecture-demonstration method in the teaching of high-school biology.

The normative-survey method. The normative-survey method makes use of standards or norms in evaluating group data. These standards or norms are usually averages obtained from a large number of cases, such as the height of seven-year-old boys. With the increased emphasis upon the nature and causes of individual differences and with the development of tests and other means of evaluation, the normative-survey method developed and expanded. During the latter half of the nineteenth century Galton devised various sorts of sensory tests, which he used in measuring sensory acuity, sensory discrimination, and sense perception. The development of these and other tests provided a means for collecting data on the growth of individuals. Also, such tests furnished a means for collecting data and comparing individuals and groups.

The normative-survey method makes use of many techniques for collecting data other than tests. Some of these techniques include: (1) questionnaires, (2) interviews, (3) direct observations, and (4) such survey-appraisal methods as rating scales and score cards. This method is especially concerned with studying existing conditions by whatever instruments may be available for gathering data.

The clinical method. The clinical method is of an intensive nature. The method studies a single individual, intensively, by all means available. This is usually known as a case study. The complete cycle of a case study includes: (1) determination of the status of the phenomenon under investigation; (2) collection of data relating to the circumstances associated with the given phenomenon; (3) identification of the causal factors; (4) application of remedial measures; and (5) follow-up to determine the effectiveness of the corrective measure.[4]

The following problem cases are suitable for study by the clinical procedure:

1. The severe stutterer
2. The overly aggressive child
3. The resistive child
4. The delinquent

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[4] Carter V. Good, "Methods of Research and Problem Solving in Education," *Journal of Educational Research,* Vol. 34 (1940), pp. 81-89.

The genetic method. The extensive growth studies of individual children have been conducted during the past quarter of a century over a long period of time. This genetic approach recognizes that each child's development is unique in nature and should be interpreted in terms of his own rate of growth. Known as the longitudinal approach, it involves repeated measurements or observations of the same individuals for relatively long periods. The genetic method has been used extensively in studying such problems as the development of locomotion in infants, language development during early childhood, personal-social development during the first two or three years, changes in children's interests in the radio and motion pictures, emotional growth and development during infancy and early childhood, as well as other aspects of the child's growth and development.

Educational psychology and education. Education is possible because humans can learn. Mary will learn at school, even though little effort may be made to guide and direct her learning activities. However, it is not the major function of educational psychology to attempt to determine why Mary should go to school and what should be the goals of the school. This responsibility lies with the social and educational philosophers of the present age, individuals who must indicate what changes in human aspirations are desirable, and what the goals of education are. Once these goals are determined, it becomes the responsibility of educational psychology to try to arrive at the best methods of achieving them.

Educational psychology deals particularly with *how* and *when*. For example, in the area of reading it furnishes valuable information about when different aspects of the reading program should be introduced; the types of reading materials that should be included at different ages and grade levels; the procedures for teaching reading; and children's interests in reading. In the case of teaching typing, it prescribes the length of the study period, how the two hands should operate in the learning tasks, and what combination of letters should be practiced. Educational psychologists have conducted studies on practically all aspects of the school curriculum, methods of teaching, problems of individual differences, and related aspects of the educational program. These studies have led to important changes in the curriculum and teaching procedures.

Furthermore, educational psychology has made a significant contribution to changes in educational philosophy. The beginnings of this were reflected in the writings of William James and John Dewey, who, as psychologists, played important roles in the development of a sound philosophy of education suitable to our society.

Educational psychology and the needs of teachers. The needs of society are a reflection of cultural circumstance. The role of the teacher in the statement of the goals set forth for the schools is of utmost importance. It is the purpose of educational psychology to provide teachers with certain basic understandings, attitudes, and skills that will enable them to better guide the learning and development of Mary and the other pupils. The teacher needs a wide range of knowledge and skills, but this is not sufficient. She needs to understand children and adolescents. Teachers cannot safely depend upon the imitation of others or trial and error in their teaching activities. The task of the teacher in the modern school has become that of guiding and stimulating children in their development and learning. In this connection it has been pointed out:

> Good teachers will know how to select subject matter suitable to the children with whom they work, and how to present it in ways that will make it likely that it will be genuinely absorbed.[5]

Teachers everywhere are confronted with tasks and problems which have a common psychological basis. During the past several decades, students of educational psychology have arrived more closely at the materials in the broad areas of educational psychology that are most useful to teachers. These materials include a better understanding of child dynamics, the social process, learning procedures, and guidance techniques.

Educational psychology and teacher education. Educational psychology is a recognized part of the teacher training program wherever the objectives are to cultivate more effective teaching through verified information, sound principles, and generalizations. Teaching is defined by Trow as "the process of structuring the environment of an individual so as to produce desired behavior." [6] This is shown graphically in Figure 1-1.

The letter "I" refers to the individual growing and developing in an environment "E". Anderson has pointed out that,

> An educational psychologist is essentially a scientist studying the person whom society deems educable and wants educated. He discovers and verifies the best procedure that society's agents, its teachers, through its schools and other educative agencies, may utilize to educate these persons.[7]

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[5] Commission of Teacher Education, *Teachers for Our Times* (Washington: American Council on Education, 1944), pp. 164-165.

[6] Wm. Clark Trow, "Educational Psychology Charts a Course," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 285-294.

[7] G. Lester Anderson, "Educational Psychology and Teacher Education," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 280-281.

The educational psychologists are interested in discovering and verifying methods and materials that will lead to the desired educational outcomes. The desired outcomes are indicated on the chart of Figure 1-1 by the numbers 4, 5, and 6.

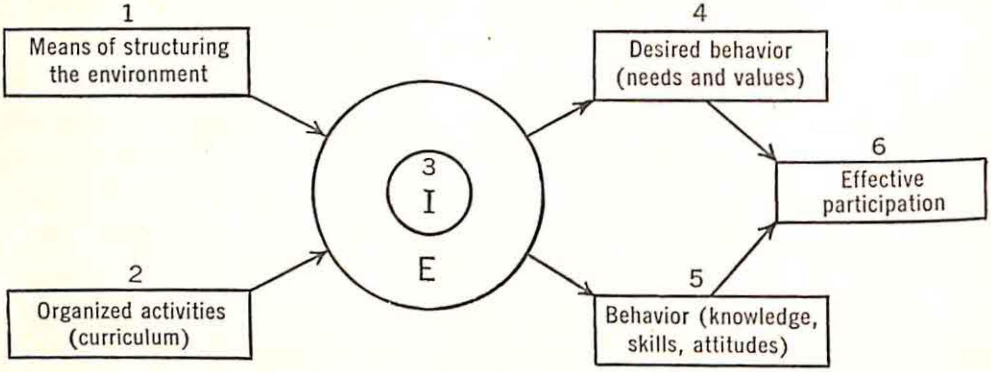
1
Means of structuring the environment
2
Organized activities (curriculum)
3
I
E
4
Desired behavior (needs and values)
5
Behavior (knowledge, skills, attitudes)
6
Effective participation

FIGURE 1-1. Chart showing the process of education and the points where educational psychology functions

What, then, is the function of educational psychology in the development of competent teachers? The teacher, following a study of educational psychology, should:

1. Know and understand a body of information about growth and development, learning, measurements, and mental hygiene, which will enable him to make sounder decisions in dealing with educational problems.
2. Have an understanding of the fundamental principles of growth, learning, and personality development as a basis for guiding him in his activities and responsibilities.
3. Possess certain skills and techniques useful in understanding and guiding children in their educational, personal and social development. This would include the ability to (a) use intelligence tests and achievement tests as a part of their teaching and guidance procedures, (b) maintain a learning environment conducive to the favorable development of children, and (c) techniques for helping children in the solution of their problems.
4. Develop a scientific attitude and an experimental approach to an understanding and solution of educational problems.

SUMMARY AND CONCLUSIONS

In this chapter educational psychology has been defined as the scientific study of the activities of individuals in situations commonly classified as educational. It is that phase of psychology which concerns itself with the development of boys and girls with particular reference to the part played by the school in their development. The field of educational psychology, following the early studies by Thorndike and other students of educational development and learning, has gradually developed through a period of approximately sixty years. More recent experimentation has resulted in a restatement of many of the earlier theories involving educational psychology, but the fundamental goal of a better understanding of growth and learning has remained unchanged.

Educational psychology must help the teacher to understand more readily the nature of the raw materials with which he must work, and should provide him with the information that will enable him to select subject matter and guide the individual in his growth and development with wisdom.

Educational psychology is a product of the joint efforts of psychologists and educators and as such will continue to be useful to both groups. From the vast amount of research that is available, from the studies of students in educational psychology and related fields, materials have been selected and are included in the chapters that follow.

Questions and Exercises

1. Many books in educational psychology devote considerable space to a discussion of the results of animal experiments. How can the inclusion of such materials be justified?
2. Make a list of at least ten problems in education which students of educational psychology should study. Indicate the reasons for the inclusion of each problem in your list.
3. Examine several recent textbooks in educational psychology for the amount of space devoted to the different areas. What do these findings indicate relative to the field of educational psychology?
4. Describe the parallel-group method of experimentation. List several problems that would be studied by this method.
5. What are the major characteristics of the experimental method? What are some limitations to the use of this method in the study of problems in educational psychology?
6. It has been said that the application of psychological principles to educational practice does not take place for several years after their discovery. What causes this lag? List the advantages and disadvantages of such a lag.
7. Prepare a report summarising the main ideas from the article by Lester G. Anderson, listed in the selected references (or other similar article).

Recommended Readings

Anderson, G. Lester, "Educational Psychology and Teacher Education," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 275-284.

Bruce, William F., "The Relation of Educational Psychology with General Psychology," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 261-266.

Crow, Lester D., and Crow, Alice, *Educational Psychology*, rev. ed. (New York: American Book Co., 1954), Chap. I.

Gates, A. I., *et al.*, *Educational Psychology*, 3rd ed. (New York: The Macmillan Co., 1948), Chap. I.

Skinner, Chas. E., Editor, *Educational Psychology*, 3rd ed. (New York: Prentice-Hall, Inc., 1951), Chap. I.

Trow, W. C., "Educational Psychology—Individual or Social," *Journal of Consulting Psychology*, Vol. 5 (1941), pp. 265-269.

Witherington, H. C., *Introduction to Educational Psychology*, rev. ed. (Boston: Ginn and Co., 1951).

The following is a *select list* of general texts in educational psychology, published since 1948. Such a list furnishes a useful reference library for students and teachers of educational psychology.

Bernard, Harold, *The Psychology of Learning and Teaching* (New York: McGraw-Hill Book Co., 1954).

Blair, G. M., Jones, R. S., and Simpson, R. H., *Educational Psychology* (New York: Macmillan Co., 1954).

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Mursell, James L., *Psychology for Modern Education* (New York: W. W. Norton and Co., 1952).

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PART I

Human Growth and Development

CHAPTER 2

The Nature of Growth and Development

THE INDIVIDUAL concerned with the guidance and direction of children should have a clear understanding of the nature of their growth and development. The parent who recognizes that growth follows an orderly process will not attempt to drive the child in his motor, mental, and emotional development. The teacher who recognizes that individual differences exist in the rate of growth among children will not expect all children to produce a similar quality of work in their school assignments. The purpose of this chapter is to provide the student with a better understanding of the nature of the child's growth and development.

ORIGIN OF THE INDIVIDUAL

The newborn infant is a product of two family lines. His development begins with the fertilization of the egg cell. From the moment of conception, the new life is influenced by various environmental stimuli. These stimuli help to mold the potentialities for growth and development which he inherits from his parents. Thus the infant at birth is patterned by hereditary and environmental influences. The interdependence of these influences may be noted in all aspects of the child's development. For example, the development of oral speech must await the maturation of certain physiological structures involved in the production of differentiated sounds.

The hereditary process. Man is composed of two types of cells: *somatic* and *germ*. Somatic cells are the body cells not directly involved in reproduction. During the period of growth they divide to produce body growth and to repair cells. The germ cells are specifically concerned with reproduction. They exist from the earlier fetal stage, but do not assume their special characteristics until after the period of puberty, when reproduction becomes possible. The union of the germ cells of the male and female under favorable circumstances produces the fertilized egg, which is the actual beginning of a new life. The male germ cells are referred to as spermatozoa, while the female germ cells are known as ova. The ovum, usually referred to as the egg cell, differs from the sperm in size and shape. In the process of fertilization the sperm cell penetrates the outer membrane of an ovum as shown in Figure 2-1. This is then followed by a period of cell division during which the egg cell divides and redivides according to a schematic and orderly plan laid down by nature.

Within a species, all cells, except those involved in reproduction, possess the same complement of chromosomes. In the fertilized egg cell the chromosomes appear in pairs, there being 24 from each parent, making a total of 48. These chromosomes contain a very large number of smaller units, the genes. These genes carry the inheritance of unitary traits, such as the color of the hair. Like the chromosomes, the genes are in pairs, that is, there is one gene for hair color in one chromosome, and there is another gene for hair color in the homologous chromosome. These genes interact in a number of complex ways. The manner in which they produce the traits of the individual are known as the *laws of heredity*.[1]

The role of selection. The gene combination present in the newly formed embryo consists of two corresponding sets of genes from each parent. This combination produces both similarities and diversities. These similarities may be observed among newborn infants in all areas of the world. However, except for identical twins, there are always differences discernible. These differences appear in their physical appearance, potentialities for development, and dynamic characteristics.

The infant emerges as a physical and dynamic being. From the beginning of its existence the complex organism is a product of two sets of genes. The role of selection is such that a close system of inbreeding will ultimately separate a mixed stock into a genetically pure line. The results of the

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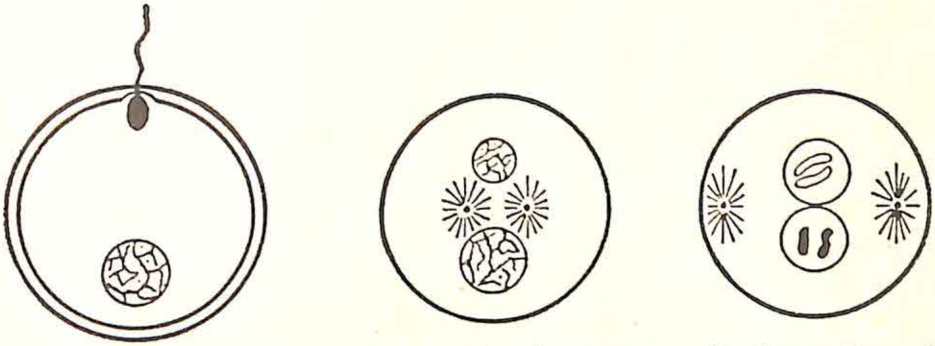
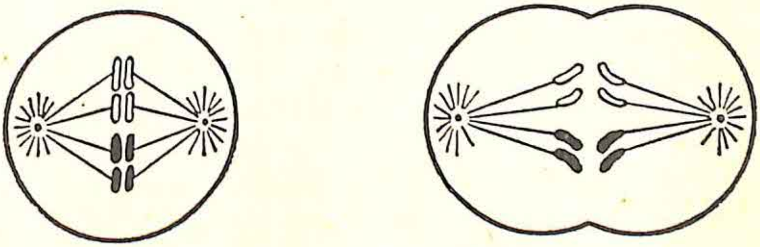
[1] The publication of the experiments on hybridization by Gregor Mendel in the *Proceedings of the National History Society of Brunn* in 1866 was a new epoch in the advancement of the knowledge of heredity. His study was based upon experiments conducted during the previous ten years with many varieties of garden peas. It was from these experiments that he derived the *law of dominance*. This led to the *law of segregation*, which is based upon the concept that the individual is characterized by a number of unit characters. A complete description of Mendel's studies and more recent developments relative to the modes of transmission of genes will be found in recent texts in genetics.



1. Entry of sperm

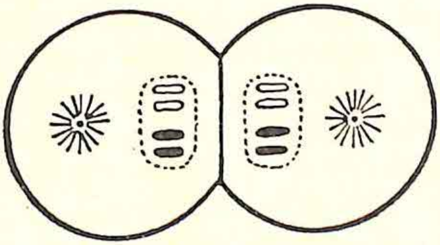
2. Approach of sperm nucleus

3. Formation of chromosomes



4. Splitting of chromosomes

5. Migration of chromosomes



6. Two-celled stage

FIGURE 2-1. The mechanism of fertilization

In this diagram paternal chromosomes are represented as black, maternal as white. The number of chromosomes characteristic of the species illustrated is given as four

(From H. E. Waters, *Genetics*. Copyright, 1913 by The Macmillan Company and used with their permission) studies by Mendel and by more recent investigators lead to this conclusion. Thus, if certain motor skills were dependent on multiple genes, a careful breeding based upon selection and inbreeding would ultimately produce a genetically pure line with a very high degree of such skills. Such a procedure has been followed in the development of pure strains of cattle.

Since there is such a vast number of possible gene combinations, one finds a wide range of individuality resulting from heredity. However, special abilities or defects are brought together through close inbreeding, producing individuals of outstanding abilities or weaknesses. In this connection, it is frequently difficult to determine the extent to which such traits are a result of hereditary factors, environmental influences, or a combination of the two. This should be borne in mind in an interpretation of the factors involved in the growth and development of individual children. For example, the particular combination of sounds which the normal child learns to make in connection with specific objects and situations will depend upon his social environment. This interrelation will be enlarged upon in the later discussions bearing upon growth, development, and learning.

THE INDIVIDUAL AND HIS ENVIRONMENT

Environment has sometimes been regarded as a passive place in which an individual's behavior occurs. Such a viewpoint regards the environment as a setting for behavior, rather than as an active stimulating agent. From an educational standpoint, environment may best be thought of as consisting of a myriad of specific stimuli that stimulate the individual to action. Some of these are visible while others, such as the feelings, aspirations, thoughts, and attitudes of others are in the main invisible.

Various attempts have been made to identify the influences of heredity and environment as unique forces. In this connection we have the familiar terms, "heredity *vs* environment," or "nature *vs* nurture." When heredity and environment are studied in relation to the organism, it will be observed that they operate together rather than as separate forces in producing changes in behavior and physical characteristics of the individual.

Interaction of heredity and environment. The most widely recognized principle involving the operation of heredity and environment upon the development of the individual is that of the interaction between the two. The tendency of early students of child development to classify all behavior as exclusively hereditarian or environmental met with many difficulties. It thus became apparent to many students concerned with these problems that the two were closely related and that most behavior could not be classified exclusively into either of these two categories. This position has been supported by more recent studies of factors affecting growth and development. The failure of a typical first-grade child in the United States to identify a radio from a simple descriptive definition would be an indication of mental inferiority, while such a failure among typical children from the interior of China would indicate that they lacked an opportunity to learn about a radio. One's selection of elements in his environment and his reaction to such elements will be affected by varying conditions of either heredity or environment. The hard-of-hearing child will fail to respond to the differentiation of tonal qualities present in certain pieces of music, while the child with a limited rural background will reveal a narrow understanding of the care of livestock. Concerning the operation of heredity and environment, Anastasi and Foley have stated the following:

> It is clear that any estimate of the relative contribution of hereditary and environmental factors to individual differences depends upon the range or extent of both hereditary and environmental differences within the population under consideration. But this is by no means the only sense in which the roles of heredity and environment are mutually interdependent. The nature and extent of the influence exerted by each type of factor depend upon the contribution of the other. In other words, any one hereditary factor would operate differently under different environmental conditions. Conversely, any environmental factor would exert a different influence depending upon the specific hereditary material upon which it operates.[2]

Inheritance of acquired traits. For many years there was a general acceptance of the theory of acquired traits. The theory, presented first by Lamarck in 1809, is the most clearly formulated. It received considerable attention and is generally referred to as the Lamarckian hypothesis. This theory emphasized the importance of use or exercise in the development of traits which were then passed on to the next generation. Such a theory explained that the long neck of the giraffe resulted from its use in securing food from trees and from other activities related to his daily habits. This stretched neck, it was believed, was then passed on through heredity to the next generation.

August Weismann, challenging this theory in 1883, offered the thesis of the *continuity of the germ plasm*. According to this theory the germ plasm (the bearer of heredity) continues to flow from one generation to another, and is neither produced by the body cells nor affected by their experiences. Many studies have been conducted to throw further light upon Lamarck's concept of the inheritance of acquired traits. Results of these studies have in general given support to the opposing theory presented by Weismann. Biologists and psychologists are, therefore, inclined to believe that germ cells are relatively independent of the body cells and that acquired traits are not passed on to the next generation. In this connection, Kuppusawny, in describing the distribution of mental ability among the depressed classes and castes of India, made the following observation:

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[2] Anne Anastasi and J. P. Foley, "A Proposed Reorientation in the Heredity-Environment Controversy," *Psychological Review*, Vol. 55 (1948), p. 241. Reproduced by permission of the journal and of the American Psychological Association.

> . . . As is well known it is only the higher castes that were given the opportunity of education till recently. For some three thousand years or so the higher castes have been receiving education generation after generation in succession. The lower castes, particularly the lowest—the Panchamas, have received no education whatever for a similar period. The castes in India have been strictly endogamous. But in recent years, with a change in social outlook, when the Panchama boys and girls are given facilities to attend schools and colleges we find that they are responding well. They have been taking University degrees and holding responsible offices in civil and educational services. Among the front rank of Indian political and social leaders are to be found members of these castes. This great social experiment demonstrates that though among castes the literary habits have been cultivated for some thousands of years generation after generation, and in some other such habits were never cultivated, today when the boys and girls of the different castes are taught these habits we find that they are responding equally well.[3]

PRINCIPLES OF GROWTH

As the child emerges from one developmental period to another certain changes may be observed. The nature of these changes will be presented in subsequent chapters. Studies show that these changes tend to follow certain fairly well-defined principles. These are here referred to as principles of growth. The most obvious change that takes place in children is their growth in size, although growth is not confined to size. It includes changes in complexity, proportion, and qualitative characteristics as well as size. Furthermore, the term *growth* is not confined to physical changes in structure or form, but applies also to the behavior and achievement of children. We speak of growth in language skills, motor growth, social growth, emotional growth, and other aspects of growth.

The terms *growth* and *development* have at times been used interchangeably. That there is no clear-cut distinction may be observed from the many different ways in which development is used. The term *development* has been used with reference to changes in complexity and design or pattern, while *growth* has been regarded as change in size. More recently, development has taken on an enlarged meaning and is thought of in terms of total development. In this case development is closely related to maturation or maturity. This may be observed in such words as child development, adolescent development, and human development. This is the general distinction made between the two terms, when such distinctions are made, in this text.

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[3] B. Kuppusawny, "Laws of Heredity in Relation to General Mental Ability," *Journal of General Psychology*, Vol. 36 (1947), p. 38.

Development proceeds from general to specific. The early motor responses of the child are mass movements. When the baby reaches for an object he reaches with his whole body. He is able to use the large muscles before he can use the smaller muscles. This may be observed in the kicking of the baby before he can co-ordinate the leg muscles well enough to creep or crawl. The baby recognizes the mother as a large moving object before he is able to discern the characteristics of the parts of the mother. Growth then proceeds from general to the specific, from mass behavior to specific or differentiated movements, and from general forms of behavior to diffuse forms of behavior. This will be observed in later chapters in connection with motor growth and development, emotional behavior, and social behavior.

Growth is a continuous process. The various stages of life are often divided into different periods, largely for convenience in studying the different stages of development. This, however, has led many people to look upon growth as periodic or saltatorial rather than continuous in nature. There is good evidence from longitudinal studies of individual children that there is an *orderly sequence* for the emergence of different forms of behavior. This should not lead one to conclude that the child's development is unadaptable to certain modifications; although a sound educational program will be cognizant of these behavior patterns which emerge at different stages in the child's development. The scheduled behavior at different age levels shows a gradual and continuous growth in the complexity of behavior performed. The pattern of motor development is well illustrated in the results of the study by McGraw showing the early developmental phases leading to creeping and crawling.[4] This is shown in Figure 2-2.

What occurs at one stage of growth carries over and influences the subsequent growth stages. This process takes place at a slow regular pace, rather than by leaps and bounds. It can be stated as a fundamental growth principle that each stage in the development of the individual is an outgrowth of an earlier stage, not a mere addition to it. This is illustrated in

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[4] Myrtle B. McGraw, *Growth: A Study of Johnny and Jimmy* (New York: D. Appleton-Century Co., Inc., 1935), p. 70.

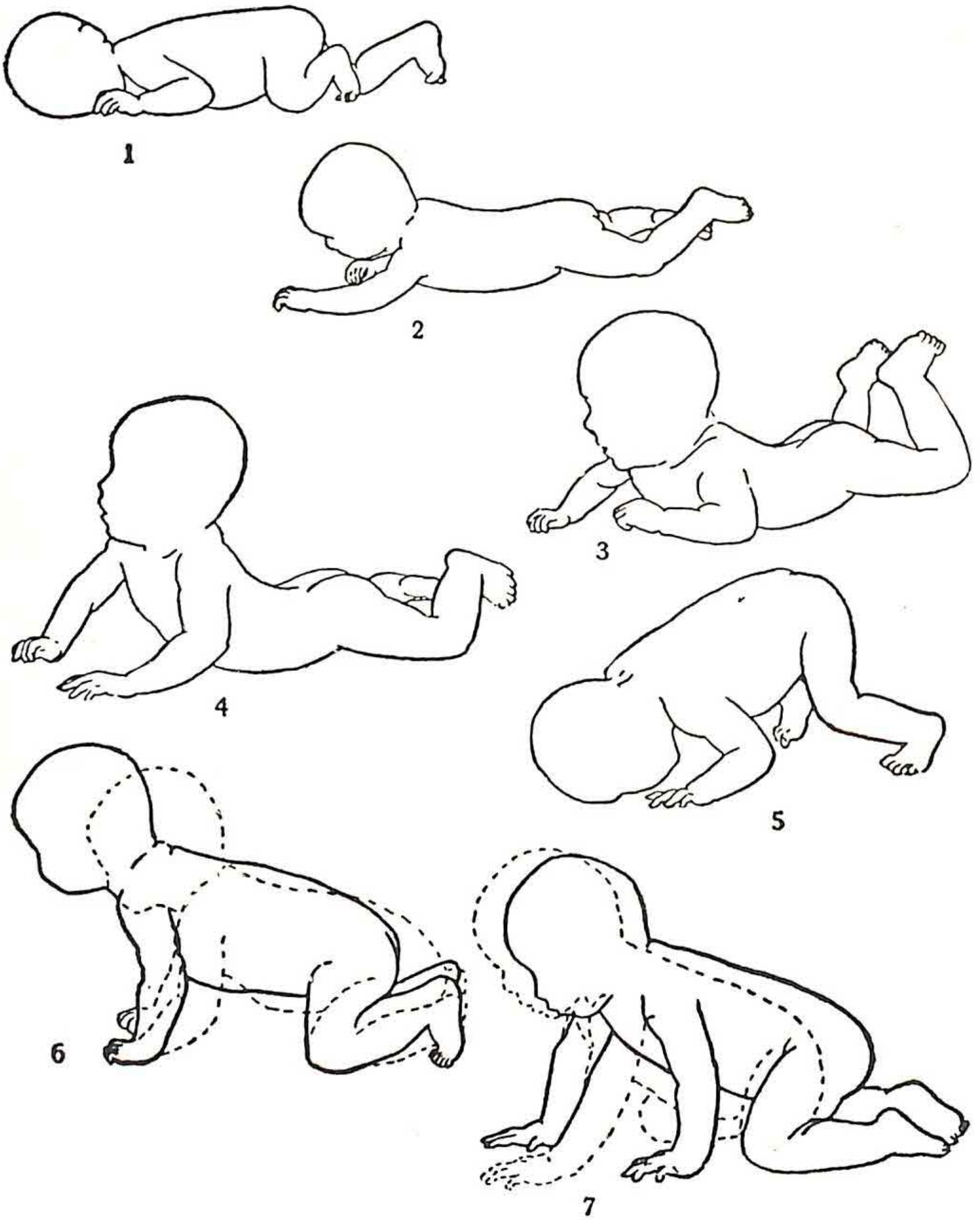

FIGURE 2-2. Phases in the development of crawling and creeping in an infant

(*1*) Newborn crawling movements. (*2*) Less activity in lower extremities; begins to hold head up. (*3*) Increased control over movements of head and shoulder girdle. (*4*) Marked development in upper part of body; pelvis rests on the surface. (*5*) Conflict in action of pelvic and shoulder regions; when pelvis is raised, head and shoulders are lowered. (*6*) Rocking movements; maintains abdomen above surface. (*7*) Associated creeping movements the development of the bones. The baby's bones begin to develop long before birth and are closely related to the diet of the mother during this period; however, they pass through various stages in their ossification.

The rate of growth is not even. Although growth is described as continuous, specific aspects of growth do not occur at the same rate at different times. For example, a child may speak several words at twelve months of age, but in the next three or four months acquire no additional words, since he is busy with the acquisition of motor skills involved in locomotion. It has been observed that muscular co-ordination does not keep pace with the accelerated growth in height during the early stage of adolescence. Furthermore, different parts of the body do not grow at the same rate. This is shown in Table 2-1, in which the developmental status of a ten-year-old child is presented.[5] Any person concerned with the education of children should recognize the differences in the rate of growth of different parts of the body and of different abilities. Thus, at a given age level there will be differences existing in the degree of maturity of the various traits and abilities. Again, individual growth curves for height, weight, strength, and motor co-ordinations show plainly that the rate of growth is marked by fluctuations.

TABLE 2-1. *Developmental status of a ten-year-old child*

TRAIT	PER CENT OF 18-YEAR STATUS
Strength of grip	37
Weight of body	48
Sensitiveness to pain	65
Stature (standing)	78
Rate of tapping	82
Size of skull	96

Children differ in rate of growth. Although children tend to follow an orderly pattern of growth and development, it should be recognized that each child grows at his own unique rate. Millard has referred to a principle of individuality of growth, pointing out that no two children grow exactly alike. He states: "Children differ in their rate of growth, in the ages at which they begin a particular kind of growth, and in the maximum toward which they are growing."[6] This may be observed from an examination of the growth curves of two or more boys or girls in height or weight. The growth curves for the height of six subjects are presented in Figure 2-3.

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[5] H. L. Hollingworth, *Educational Psychology* (New York: Appleton-Century-Crofts, Inc., 1933), p. 111.

[6] Cecil V. Millard, *Child Growth and Development in the Elementary School* (Boston: D. C. Heath and Co., 1951), p. 12.

Deviations in growth may be observed in mental, emotional, and social traits as well as in physical traits. Two children with the same reading ability at the age of seven may reveal significant differences in subsequent years.

The growth rate of each individual is affected by many forces both within and without the body. This has at times been listed as a fundamental growth principle. The prediction of growth is made very difficult by this fact. Some of the major factors affecting growth and learning will be discussed in subsequent chapters.

It is important for the teacher and others concerned with the education of children to understand individual differences in rate of growth. Parents, likewise, should realize that such differences are normal and that a deviation of one child from another should not be a source of disturbance. The timing of the growth spurt which takes place around the beginning of adolescence will vary considerably from individual to individual of the same sex. The failure on the part of teachers and parents to recognize these differences in the rate and timing of certain growth features is often a source of misinterpretation and faulty guidance.

The child develops as a unified whole. Although we speak and write of physical growth, motor growth, mental growth, emotional growth, and other aspects of growth, we should realize at all times that it is the *total child* who is growing. The interrelation of growth has received considerable attention in recent years as a result of the great amount of research that has been conducted on problems of child growth and the development of the organismic concept of studying children. The organismic viewpoint emphasizes the harmony and the interrelation of the growth of the component parts of the individual. Thus, the organism is conceived of as a closely knit community, with the individual growing and functioning in a unitary manner rather than in a nonrelated manner.

The growth of the child as a unified whole may be very well illustrated by his growth in the ability to creep, crawl, and walk. This growth, in the case of the average child, will be accompanied by changes in interests, attention, mental outlook, and social behavior. Furthermore, it can be shown that changes in interests and social behavior are closely related to growth in language and motor co-ordination. This interrelation is so close that when one is lacking or delayed the other will be affected. The individual passes gradually from one stage to another in his learning and maturation, preserving a patterned integration throughout life. In other words, growth and development are patterns rather than isolated aspects affected by addition of minute increments to separate parts. Learning and development do not

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Good nutrition is recognized as essential for the maximum growth and development of children

take place in a piecemeal fashion in which unrelated items appear at different periods and at some later date become fashioned into a unified pattern. The entire child is involved in learning to read and skate. The child's emotional nature, social self, and physical self are involved, along with the intellectual self, in the acquisition of reading and language skills. This notion is most important for those who would direct the learning of children, and for this reason it will be given further attention in later chapters dealing with learning.

Behavior patterns change with maturity. Children display many forms of behavior at different levels of maturity that will be modified or abandoned as they grow older. If adults, concerned with the guidance of growing boys and girls, were better informed about the changes that occur and were patient enough to study these more or less sequential growth patterns, the problem of being a parent or teacher would be simpler and more pleasant. The child would grow and develop toward maturity with less difficulty and confusion. This principle of development includes the concept that behavior activities that appear at one stage or level of maturity are modified or abandoned at a later stage in favor of activities more useful and harmonious with the chi ul ; total development.

.., Vol.

MATURATION AND LEARNING

A practical consideration in making a distinction between changes affected by learning and those resulting from maturation is important both from the standpoint of understanding the child and of guiding him in his education at home and at school. It is most helpful if we understand at what stage in the child's development the teacher should introduce the various skills and concepts in order to secure the greatest benefits to the child. Such information can prevent parents and teachers from attempting to force the child's development by introducing experiences before he is ready for them. It also enables the schools to organize activities at those stages in the child's development when the maximum benefits would result from such activities.

Maturation and acculturation. It is often stated that the individual receives his biological inheritance through maturation, while he acquires his social inheritance through acculturation or learning. Learning is generally thought of as changes brought about as a result of experiences. The fact that there is a constant and continuous interaction of environmental and hereditary factors, from the beginning of life, makes it difficult to separate completely the effects of these factors from the development of the child. Thus, in spite of the fact that these words can be given rather definite meanings, physiologically, the two processes do not appear to be separable.[7]

Effects of restricted practice during infancy. Early experimental studies of the pecking activities of chicks showed the importance of maturation in the development of accuracy in pecking grain. Further data on the importance of maturation is offered in the studies by Carmichael.[8] In these studies, frog and salamander eggs were kept in the laboratory until tail buds appeared. One group was then placed in plain water, while another group was placed in a weak solution of chlorotone. This drug does not interfere with growth, although it produces complete immobilization. Therefore the tadpoles in this solution did not move about, while those in the plain water swam around in the normal manner. At a later date, the drug was washed from the anesthetized group of tadpoles. They were then placed in plain water. Within a half hour period these frog and salamander tadpoles were swimming so well that they could not be distinguished from those that had been placed in the plain water and had been swimming from an earlier date.

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[7] See Leonard Carmichael, "A Re-evaluation of the Concepts of Maturation and Learning as Applied to the Early Development of Behavior," *Psychological Review*, Vol. 34 (1936), p. 466.

[8] Leonard Carmichael, "The Development of Behavior in Vertebrates Experimentally Removed from the Influence of External Stimulation," *Psychological Review*, Vol. 33 (1926), pp. 51-56.

The studies conducted by Dennis and Dennis of the effects of cradling practices upon the onset of walking among Hopi children is of special interest in this connection.[9] They were able to compare the age of walking of those groups who made use of a cradle-board with those who used no cradle-board. The cradle-board consisted of a heavy board about one foot wide and about two and one-half feet long, with a head guard of heavy wire at one end. At birth, the infant is placed on the board, which is covered with a cotton blanket. The arms are extended to the side. The blanket is pulled up from the left side and carried across the body and tucked between the body and right arm. The right side of the blanket is pulled over the right side and arm in a like manner. The baby and board are tied together with strips of cloth so that the child can flex his legs only to a small degree. However, the head which rests on a small pillow of folded cloth, is relatively free to move.

The baby spends most of his first three months in this position, being moved one or more times each day to have soiled clothing removed. His nursing and sleeping hours are spent on the board. After the early months the use of the cradle-board is gradually decreased. The time for discarding it varies, ranging from four to nine months. Comparisons were made of the age of starting to walk by sixty-three children who had used the cradle-board with forty-two who had not used such a board. These comparisons showed that such cradling did not affect the age of walking. Practice beyond a certain minimum seems to have little effect on infant behavior. It appears likely that nature has endowed most infants with more activity than is needed to form new responses.

Effects of delayed practice on growth. The co-twin method has been used by Gesell and others in studying the influence of early practice or exercise on growth and learning.[10] This method makes use of identical twins, one of whom becomes the control subject while the other becomes the experimental subject.

In this study, beginning at the age of forty-six weeks, one twin (twin T) was given training in stair-climbing, while the other twin (twin C) was given no such training. After six weeks of training, twin T climbed the stair case in twenty-six seconds. At the beginning of the fifty-third week, twin C was given training in stair-climbing. At this time she climbed the stair case in forty-five seconds, but after two weeks of training she was able to climb it in ten seconds. Thus, twin C rapidly reached a level of achievement as high as that attained by twin T, primarily because of her advanced maturation when she began the stair-climbing.

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[9] W. Dennis and M. G. Dennis, "The Effect of Cradling Practices upon the Onset of Walking in Hopi Children," *Journal of Genetic Psychology*, Vol. 56 (1940), pp. 77-86.

[10] See A. Gesell and H. Thompson, "Learning and Growth in Identical Twins: An Experimental Study in the Method of Co-twin Control," *Genetic Psychology Monographs*, Vol. 6 (1929), pp. 1-124.

Similar results have been obtained from other studies of infants dealing with manipulating cubes, cutting with scissors, language development, memorization, and the like. In the study conducted by McGraw the effects of delay over a longer period of time were studied.[11]

A pair of twin boys, Johnny and Jimmy, were the subjects of her study. From the age of twenty-one days until he was twenty-two months old, Johnny was given an opportunity to practice certain motor activities, which he was capable of learning. Jimmy, the control twin, was given no special practice, but was given motor tests at varying intervals. The behavior development of these subjects was then compared from time to time. Also, they were compared to that of a group of sixty-eight children of the same age in whom these activities were also observed.

The results of the study showed that Johnny made phenomenal progress in learning to roller skate when he was a little more than one year old, but that he didn't make much progress in learning to propel a tricycle until several months later. This study also indicated that there is a certain time-range within which a child may be able to overcome any ill-effects of delay; but if this is prolonged the child's development will be adversely affected. One activity tends to prepare for certain other activities. A child who has not learned to skip a rope may be denied the opportunity to join with the group in activities involving rope-skipping. A boy who has not learned to play baseball during the early teen years will not be chosen as a member of a baseball team at a later stage in his development. The social skills of teen-agers will be closely related to various skills already acquired. The child who is deficient in these skills will feel embarrassed and will thus tend to refrain from entering into social activities of members of both sexes. Thus, we conclude that long delays in the development of certain important skills may seriously affect a child's later development and adjustment.

Learning—a developmental process. It has been emphasized throughout the previous discussions that maturation and learning are related processes. The educational importance of maturation in the learning of a motor skill is evident to most teachers. According to the developmental process, skill is gradually attained as a result of maturation and practice, awkward movements are eliminated, and better-co-ordinated movements are thus developed. In the case of learning to read, to multiply, and to apply scientific knowledge to the solution of problems, the developmental process is also present, but less clearly understood by most teachers.

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[11] Myrtle McGraw, "Later Development of Children Specially Trained during Infancy: Jimmy and Johnny at School Age," *Child Development,* Vol. 10 (1939), pp. 1-10.

It will be pointed out in later chapters, dealing specifically with learning, that the developmental process is related to the learning of arithmetic combinations and abstract concepts, just as it is in the acquiring of a simple motor skill such as throwing a ball. The term *readiness* has been used for the developmental process of learning. Readiness includes physiological, psychological, and educational aspects. Much of the previous discussion, bearing on maturation, relates to the physiological aspect of readiness. The child who is mentally immature is not ready to learn concepts of an abstract nature. He must deal on a simpler and more concrete plane. The individual who is not properly motivated is not in a state of readiness for learning and applying scientific principles or grasping the importance of certain historical events. Children often fail in the learning of new materials because of a lack of readiness for such learning. Concepts take form through a process of gradual growth. The child will be unable to understand centrifugal force if he has not had certain types of experiences upon which such an understanding can be built. Teachers often fail to realize the educational inadequacy of the child. Children's concepts grow as a result of new experiences. The failure of teachers to recognize the principle of readiness, will, in many cases, cause much of their efforts to be ineffectual.

Summary and Conclusion

Development has been differentiated from growth in this chapter by its more inclusive nature. Thus, we speak of child development, meaning the development of the child as a personality—a total self. Growth has been described in terms of changes in ability, structure, or behavior, that takes place as an individual passes from one age level to another. The nature of these changes will be presented in the subsequent chapters which deal with different aspects of growth. Although learning and maturation are closely related, learning has been identified with those changes produced primarily as a result of the experiences of the individual. Maturation, on the other hand, refers to changes that occur as a part of the life-process of the individual. And, although maturation and learning are closely related, the changes that occur as a result of maturation are not an outgrowth of the experiences of the individual.

The principles of growth that have been discussed in this chapter are: (1) Growth proceeds from the general to the specific; (2) growth is a continuous process; (3) growth is not even; (4) children differ in rate of growth; (5) the child develops as a unified whole; and (6) behavior patterns change with maturity. A knowledge of the operation of these principles is essential for the guidance and direction of children in their development and learning.

Curriculum materials and teaching methods should be in harmony with these principles of growth. When these principles are recognized and taken into consideration, a wide range of differences in readiness for learning will be found and differences in the rate of learning will be observed. Educational experiences will be organized in harmony with the maturation and experiences of the individuals concerned.

Questions and Exercises

1. Of what value to the teacher is an understanding of certain fundamental principles of heredity?
2. Why is it difficult to obtain completely accurate data about the influences of biological heredity?
3. What is meant by "the inheritance of acquired characteristics"? Why are conclusions about the problem here presented of special importance to education?
4. Cite illustrations to show that the rate of growth varies from child to child.
5. Differentiate growth, development, and learning. Why is it important for the teacher to have a clear understanding of the meaning and relationship of these terms?
6. Show how the different aspects of growth are interrelated. What are the educational implications of this principle?
7. Show how the child's growth in the ability to walk tends to follow an orderly sequence. What bearing does this have on guiding the child in his early motor development?
8. What is meant by the statements referring to the interaction of the individual with his environment? What does this imply relative to the importance of heredity and environment in the growth and development of the individual?

Recommended Readings

Breckenridge, Marian E., and Vincent, E. Lee, *Child Development* (Philadelphia: W. B. Saunders Co., 1949), Chap. I.

Crow, Lester D., and Crow, Alice, *Educational Psychology* (New York: American Book Co., 1948), Chap. II.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Co., 1952), Chaps. II and IV.

Gates, A. I., *et al.*, *Educational Psychology*, 3rd ed. (New York: The Macmillan Co., 1948), Chap. II.

Hurlock, Elizabeth B., *Child Development*, 2nd ed. (New York: McGraw-Hill Book Co., 1950), Chap. II.

Millard, Cecil V., *Child Growth and Development in the Elementary School Years* (Boston: D. C. Heath and Co., 1951), Chaps. II and III.

Olson, W. C., and Hughes, B. O., "Growth of the Child as a Whole," in *Child Behavior and Development*, R. G. Barker *et al.*, eds. (New York: McGraw-Hill Book Co., 1943), Chap. XII.

CHAPTER 3

Physical Growth and Motor Development[1]

PHYSICAL GROWTH is important from the standpoint of health, total development, and adjustment. The most readily observed type of growth is that of size. Fundamental to the degree to which the child will develop as a personal and social being is his pattern of physical growth. Although this and subsequent chapters deal with the different aspects of growth, the student should bear in mind at all times that there is a close relationship between these aspects of growth and the concept that the child develops as a unified whole.

STUDYING PHYSICAL GROWTH

Studies of physical growth are more numerous than for any other aspect of development. Methods for studying physical growth may be classified in many ways. The simplest of these consists of two divisions. One has already been referred to as *cross-sectional,* while the other is the *longitudinal* method. A brief description of these methods as they apply to physical growth should give the student a better understanding of methods of studying growth and some of the special characteristics of it.

Cross-sectional or horizontal studies. Most of the early studies of child growth used the cross-sectional method for gathering data about the height, weight, and other measures, of a large group of children. This method made use of single testings of a large group of children. This made it possible to obtain averages for different age groups. From these averages, growth curves for a number of developmental factors were secured. It was from such studies that the early height-weight charts were developed.

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[1] Some of the materials in this chapter are adapted from Karl C. Garrison, *Growth and Development* (New York: Longmans, Green and Co., 1952), Chapters V and VI.

Cross-sectional data were widely used in studying the relationship between height, weight, and other aspects of growth. By using statistical techniques, correlations revealed that there was a significant relationship between different aspects of growth, and furnished an early indication of the principle that all growth is interrelated and that the child grows as a whole. However, when children of the same age were studied, it became evident that the degree of physical development of a child was a poor indicator of his mental status.

Longitudinal studies. The increased interest in child study brought about many long-time studies. Baldwin and others were among the early investigators who made use of repeated measurements on the same children.[2] This method enabled them to plot individual growth curves for height, weight, and other physical measurements. While this method may not appear to have much immediate value, such measurements kept over a long period of time have furnished valuable information about various factors affecting growth and the general nature of growth curves. It was pointed out in the previous chapter that children do not grow at the same rate. Individual differences in the appearance of certain growth characteristics are obscured when averages are used. This is shown in Figure 3-1.[3] The average growth curve is rather even, while the individual growth curve is uneven in nature. The cyclic development found in physical growth curves has stimulated students to study further the relationship of physical growth to other aspects of growth. Materials bearing on this will be presented in subsequent chapters.

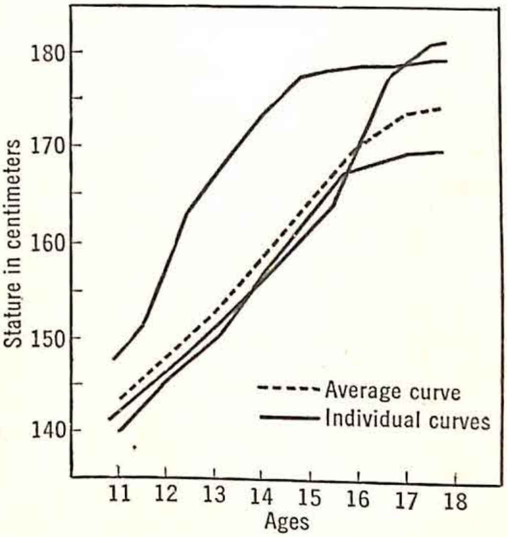

FIGURE 3-1. Comparison of average and individual curves for growth in stature

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[2] Bird T. Baldwin, "The Physical Growth of Children from Birth to Maturity," *University of Iowa Studies in Child Welfare,* Vol. 1 (1921), No. 1.

[3] Howard V. Meredith, "The Rhythm of Physical Growth," *University of Iowa Studies in Child Welfare,* Vol. 11 (1935), No. 3, p. 112.

Individual growth curves have been secured and studied for a large number of boys and girls. Certain conclusions have been drawn from these studies.[4] Some of these may be listed as follows:

1. Growth is very rapid from birth to the age of two or two and one-half years of age.
2. Growth continues at a diminishing rate until about two years before the beginning of pubescence.
3. Prior to the advent of puberty a significant increase in the rate of growth appears.
4. Following the advent of puberty there is a gradual and continuous deceleration of the rate of growth.
5. The shape of the growth curve for both sexes is very similar, but the timing of the adolescent growth spurt tends to disturb the parallelism of the growth curves for boys and girls.

Measurement in terms of "age" units. Cross-sectional data, in particular, have furnished averages based on measurements of different aspects of growth. The *anatomical age* has been widely used in recent years in studying child development. This is also referred to as the *skeletal age*, since it is concerned with assessing the skeletal development of the individual child. The anatomical age has reference to the degree of physical development in terms of changes in the bony structure. It represents the point at which the child has arrived in his skeletal development as compared to the averages for children at different age levels. It does not, however, have reference to height, weight, health, or strength. The physiological age, on the other hand, is used in connection with the development of the internal organs, especially the reproductive organs and sexual characteristics.

It was pointed out in Chapter 2 that growth studies based upon single measurements show a great deal of fluctuation. A better basis for arriving at a more accurate concept of the growth and development of a particular child is that of a combination of several age units. Olson and Hughes arrived at an *organismic age* by taking a number of different growth values of given chronological ages.[5] The organismic age is determined, for an individual child, by computing the average age unit obtained from a combination of measurements of different aspects of growth. Such a measure furnishes a basis for evaluating growth and achievement in some specific directions. An observation of growth curves of Figure 3-2 shows that the organismic age exhibits considerable stability from year to year.[6] Thus, predictions of growth based on the organismic age are more reliable than those based on a single measure.

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[4] See J. W. M. Rothney, "Recent Findings in the Study of the Physical Growth of Children," *Journal of Educational Research*, Vol. 35 (1941), pp. 161-182.

[5] Willard C. Olson and Byron O. Hughes, "The Concept of Organismic Age," *Journal of Educational Research*, Vol. 35 (1942), p. 525.

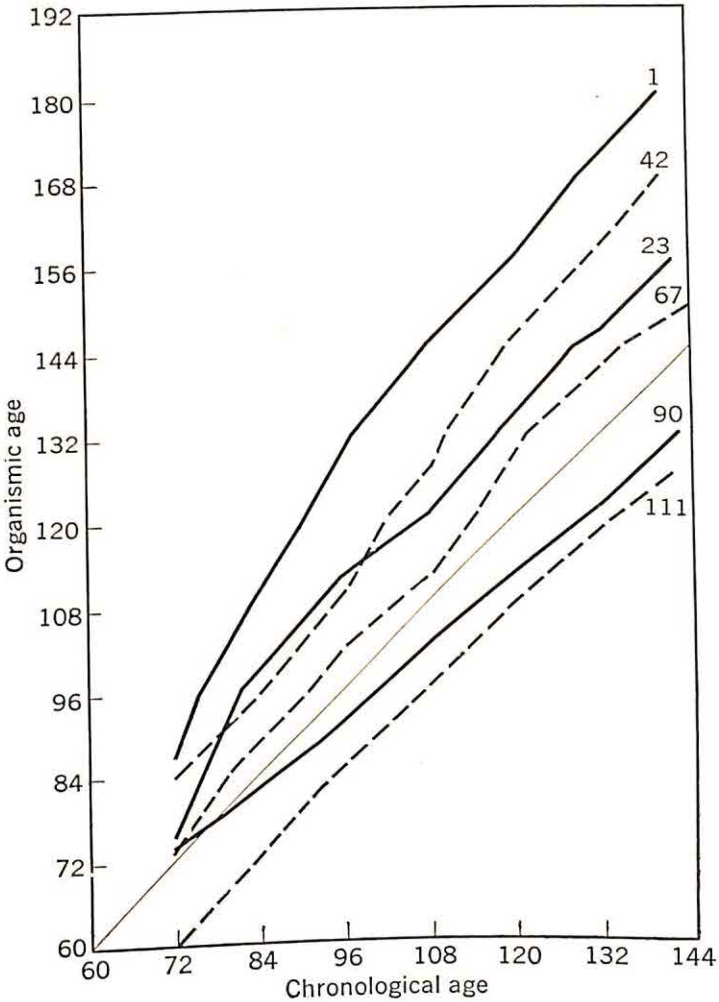

FIGURE 3-2. Regularity of growth in organismic age for illustrative children ranking 1, 42, 23, 67, 90, and 111 in a sample of 111 ranked at 96 months of chronological age

The organismic age provides a rather inclusive and stable measure of development for determining the child's actual developmental status. Its importance in estimating reading readiness, and in diagnosing difficulties in achievement, is recognized by modern educators. The question of what measures should be included in determining the organismic age cannot be answered with a high degree of finality. In most cases the measures are too few to furnish a stable organismic age. However, two measures are more likely to provide a better basis for determining the organismic age than one. Likewise four measures of different aspects of growth should give a better picture of the total development of the child than would one or two.

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[6] W. C. Olson and B. O. Hughes, "Concepts of Growth—Their Significance for Teachers," *Childhood Education*, Vol. 21 (1944), p. 60.

Evaluating physiological growth and development. It was natural that growth data for height and weight developed earlier than data for physiological measurements. For example, it was quite easy to gather height and weight measurements on large groups of children. It is more difficult to measure metabolic changes that are often used as a basis for determining energy requirements and physiological maturation. The basal metabolic rate cannot be secured as readily as can most physical measurements. Also, glandular changes may be used as a basis for determining physiological growth. Most teachers and others concerned with child development do not have the training and equipment for making such measurements.

There is also less constancy in physiological measurable factors than in physical factors. Pulse rate, metabolic changes, and blood pressure are affected by many variables. These are affected by the child's emotional state, time of day, exercise, and other variables. These difficulties, together with the need for training and special techniques for obtaining accurate findings, make the evaluation of physiological development a difficult problem for the parent and classroom teacher.

SPECIAL GROWTH CHARACTERISTICS

Changes in the proportions of the body. The changes in body proportion are clearly illustrated in a comparison of growth in height with that of the head. The total height of an adult is about three and one-half times his stature at birth, while the head nearly doubles in length. The changes in relative size of the arms, legs, trunk, head, and neck in percentage of the total body volume at different age levels beginning with the second fetal month is shown in Table 3-1.[7] The infant's head is relatively large, while his arms and legs are short, giving him a top-heavy appearance. In comparison with other parts of the face, the chin and lower parts of the jaw are small. The spinal column of the newborn infant has only one curve, but two more curves develop at a later stage.

An investigation by Boynton and Parsons of the physical development of pupils, attending the Peabody School, shows the amount of growth in thirteen physical measurements between the ages of five and one-half years and seventeen and one-half years.[8] Their study revealed that growth for the different parts of the body is far from even. For example, while the boy of five and one-half years is 65 per cent as tall as he will be at seventeen and one-half years of age, he weighs only 33 per cent as much and has only 18 per cent of the strength he will have when he attains this later age. The arm span for boys increases over 50 per cent after the age of five and one-half years, while the head circumference shows an increase of less than 7 per cent. A further lack of uniformity of growth is found in the respiratory and circulatory systems. During the early school years there is a pronounced growth in the size of the arteries, but a much smaller relative growth in the size of the heart, so that the child of twelve or thirteen has a smaller heart in proportion to the arteries than was the case at an early age. There is, however, a rapid growth of the size of the heart following pubescence.

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[7] Leslie B. Avey, *Developmental Anatomy* (Philadelphia: W. B. Saunders Co., 1946), p. 9.

The changes in the proportions of the body and its parts are a result of the following factors: (1) differences in growth intensity of the different parts of the body; (2) reduction of the early dominance of the anterior and posterior levels; (3) differential functional demands of the different parts of the body; (4) special exercises and other external factors; and (5) stimulating and retarding effects of certain parts of the body, particularly the glands.

Growth in height and weight. Longitudinal studies have brought about considerable change in the concepts of how children grow. They have also produced important changes in the use of height-weight charts, since earlier results based upon averages obscured the individual characteristics of growth in height and weight. This is clearly revealed in Figure 3-1 which shows the average and several individual growth curves for height. The

TABLE 3-1. *Changes in relative size of the parts of the body in terms of per cent of the total body volume*

AGE	HEAD AND NECK	TRUNK	ARMS	LEGS
Second fetal month	43	52	3	2
Sixth fetal month	36	44	7.5	12.5
Birth	32	44	8	16
Two years	22	51	9	18
Six years	15	50	9	26
Maturity	10	52	9	29

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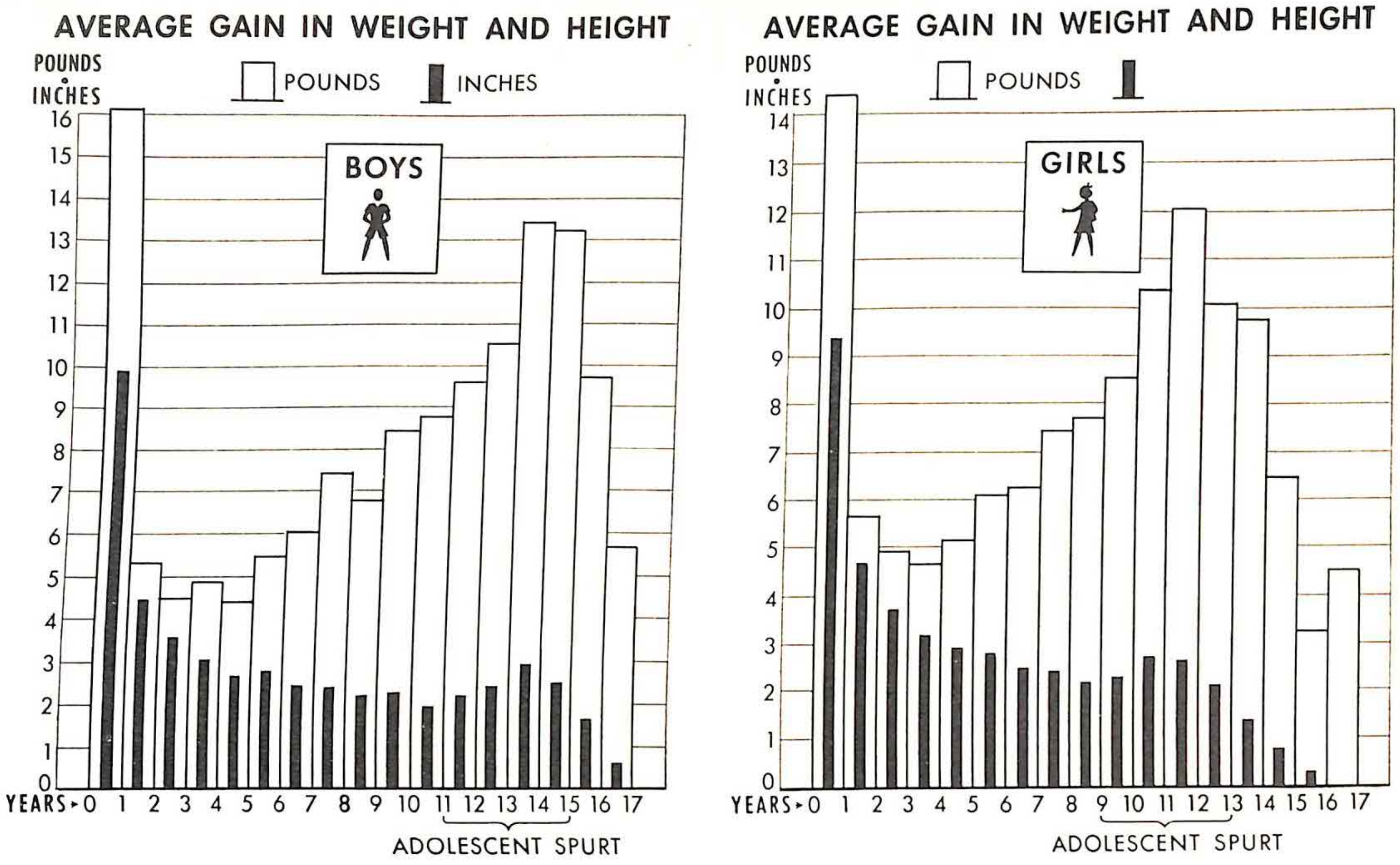
[8] Paul L. Boynton and Rosa F. Parsons, "Pupil Analysis in the Peabody Demonstration School," *George Peabody College Bulletin*, 1933.



Metropolitan Life Insurance Company

FIGURE 3-3. Average gain in weight and height

notion of the average child is a mythical one, since a truly average child does not exist. In order to evaluate gains, however, it is necessary to use some sort of units such as age units. Thus, averages or norms serve as a point of reference for making comparisons. The average child is about 21 inches tall at birth. By the age of five he will have doubled his length, and by the time he is twelve or thirteen he will have tripled his birth length. The average gains in weight and height are shown in Figure 3-3. These graphs show an early adolescent spurt followed by a rather rapid decline in rate of growth in height and weight for the average boy and girl.

There is considerable variation in the average weight of infants at birth. Some studies have shown the average to be slightly in excess of seven pounds, with boy babies slightly heavier than girl babies. There is a considerable increase in weight during the first six or seven months so that at six months his weight is approximately twice that at birth. The curve of growth for weight tends to parallel that for height, as is shown in Figure 3-3. The enormous increase during the first year and the early adolescent spurt are important characteristics of the growth curves for weight and height.

Height-weight charts derived from measurements of children are only valid when applied to children with comparable genetic and environmental backgrounds. Studies show that that children from superior environmental backgrounds are on the average taller and heavier than children of the same genetic stock reared in an inferior environment. Furthermore, the enormous variation in the rate of growth of children make it impossible to judge the *desired* weight of an individual child in terms of general averages. Also, differences in body build must be taken into consideration. Several charts have been developed in which a child's desired weight is determined in terms of averages for children similar to him in body build. In general, teachers should not be seriously concerned with the height-weight ratio of an individual child unless he deviates significantly from those of his age level with a similar body build.

Sexual maturity and physical development. There is a close relationship between developmental changes and hormones produced by the pituitary gland. In this connection two hormones are especially important. One of these is the growth hormone which enables the child to finally attain his normal body size. If there is a deficiency of these hormones, dwarfism will result. On the other hand, an excess of hormones from this gland will produce a condition referred to as gigantism.

Another pituitary hormone of importance in connection with maturation is the gonad-stimulating hormone. An inadequate production of these hormones during preadolescence tends to interfere with the development of the normal sex characteristics, while an excess of secretion of these hormones, during childhood, produces a type of precocious sexual development. Also, gonad-stimulating hormones may so act upon the growth hormones as to reduce the functioning of the latter. If these hormones appear in substantial quantities during childhood there is an arrested physical development and the individual becomes abnormally short. If, on the other hand, these hormones are late in appearing, the individual will likely develop long limbs somewhat out of proportion to the other parts of the body. Therefore, growth appears to depend upon the proper timing of the action of the growth and gonad-stimulating hormones from the pituitary gland.

TABLE 3-2. *Comparison of height and weight of different maturity groups*

AGE GROUP *	SCHOOL	HEIGHT (CM)		WEIGHT (K. G.)	
		MEANS	S.D.**	MEAN	S.D.
12 to 13 years					
Prepubescent	A	142.10	5.26	33.32	3.06
Pubescent	A	148.01	6.09	37.74	6.66
13 to 14 years					
Prepubescent	A	146.30	7.23	36.30	5.73
Pubescent	A	151.53	6.93	41.49	5.63
13 to 14 years					
Prepubescent	B	146.53	5.59	38.33	3.31
Pubescent	B	158.88	6.20	47.73	5.64
14 to 15 years					
Pubescent	B	155.91	3.76	46.00	3.55
Adolescent	B	163.83	6.00	52.18	6.07
15 to 16 years					
Pubescent	B	154.53	6.76	45.30	5.96
Adolescent	B	164.31	10.29	53.59	8.00

* In the age groups here, adolescent refers to those who have passed through the period of pubescence—the postadolescent.

** S.D. is an abbreviation for standard deviation. This is a measure of variability based on the frequency distribution. A large S.D. in comparison with the mean indicates a wide distribution, while a small S.D. is an indication of greater homogeneity.

It has already been pointed out that there is an increased rate of growth in height and weight around the beginning of pubescence. The average age of maximum growth reported by Nicolson and Hanley is 11.5 years for girls and 13.8 for boys.[9] This is the chronological age at which the largest increment in standing height occurs. A number of students of child development have compared the physical development of individuals of the same chronological age but different in sexual maturity. In a study by Ellis, 208 boys, ages eleven to sixteen, from residential schools (British) were graded into three maturing groups.[10] A comparison of the height and weight of the different age groups represented in this study is presented in Table 3-2. In each of the five comparisons, the more mature group is taller than the less mature group. However, one should use caution in generalizing from these averages to individual cases. It was pointed out in Chapter 2 that each individual grows according to his own unique pattern. There is some evidence that early maturing individuals tend on the average to be slightly taller and heavier at maturity.

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[9] Arline B. Nicolson and Charles Hanley, "Indices of Physiological Maturity: Derivation and Interrelationships," *Child Development*, Vol. 24 (1953), pp. 3-38.

Ellis also presented some interesting data showing the distribution range of a group of boys with respect to their sexual maturity.[11] These data are shown in Table 3-3. They reveal that this range is a broad one. This has been borne out from a number of studies of both boys and girls. The average age of girls (of the Adolescent Growth Study conducted at the University of California) reaching pubescence was 13.16, which is over a year earlier than the average usually given for boys.

TABLE 3-3. *Analysis of 662 examinations of boys on the basis of maturity and age*

AGE GROUP (YEARS)	NO.	NONPUBESCENT (PER CENT)	PUBESCENT (PER CENT)	ADOLESCENT * (PER CENT)
9-10	52	100	0	0
10-11	40	95	5	0
11-12	74	86.5	13.5	0
12-13	95	64.2	35.8	0
13-14	135	47.4	43.7	8.9
14-15	120	12.5	39.2	48.3
15-16	78	1.3	29.5	69.2
16-17	33	6.1	18.2	75.7
17-18	35	0	11.4	88.6

* In this study, adolescent is interpreted as those showing the physical symptoms of sexual maturity. These have been referred to elsewhere as postadolescents.

Skeletal status and physiological maturity. There is much evidence from studies of animals, as well as from studies of boys and girls, to indicate that a close relationship exists between skeletal status and physiological development. It has already been suggested that the normal development of the skeleton does not occur in the absence of adequate gonad-stimulating

[10] Richard W. B. Ellis, "Height and Weight in Relation to Onset of Puberty in Boys," *Archives of Disease in Childhood,* Vol. 21 (1946), pp. 181-189.

[11] Richard W. B. Ellis, "Puberty Growth in Boys," *Archives of Disease in Childhood,* Vol. 23 (1948), pp. 17-26.

hormones. Also, in the case of precocious sexual development there will be an accelerated skeleton development. In a study by Greulich and others, the skeleton development of 476 boys was compared with the degree of development of primary and secondary sexual characteristics.[12] X-ray films were made of the hand and wrist and of the elbow of each of the boys. On the basis of the regions X-rayed the skeletal status of each boy was estimated. A study of the sexual development of these boys showed that it was closely related to their skeletal development. This finding has been borne out from the more recent studies of this problem. This is also further evidence for the principle of growth which emphasizes the unitary nature of growth and development.

BODY DEVELOPMENT

How bones develop. The bones of the child contain, relatively, a greater amount of water and a considerable smaller amount of mineral material than do those of the adult. This accounts for their greater pliability. The ligaments and joints are less firmly knit together. This gives the child increased flexibility in certain motor movements and accounts for the characteristic "double-jointedness" present among some children. While the likelihood of bone fracture is less in the child than in the adult, there is greater possibility of the development of deformities, since the bones are less capable of resisting stress and strain from the muscles and tissues.

X-ray pictures of the bones of children show the nature of the bony structure at different age levels. The space between the ends of the bones is in an inverse ratio to the age of the child. This does not mean, however, that the bones of all children develop at the same rate. Individual differences are evident here as in other aspects of growth. Because of the nature of the child's bones, a greater amount of blood flows through them than through the bones of an adult. This characteristic helps to provide for the nutritive needs of the child's bones. This also makes the child more susceptible to bone diseases due to infection.

Studying skeletal development. The most popular method used by clinicians for observing skeletal development is the study of X-ray pictures of the hand and wrist. These X-rays show the development of the ends of the bones and the epiphyses, the relative size of the different bones, and the development of the ligaments and their attachments to the bony structures. Data thus obtained may be used in two principal ways. (1) They may be computed in terms of age units and thus evaluate the child's skeletal age. (2) They may be computed in terms of age units and thus evaluate the child's total development obtained from combining measurements of different aspects of the child's growth.

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[12] W. W. Greulich, "Somatic and Endocrine Studies of Puberal and Adolescent Boys," *Monographs of the Society for Research in Child Development*, Vol. 7 (1942), pp. 17-22.

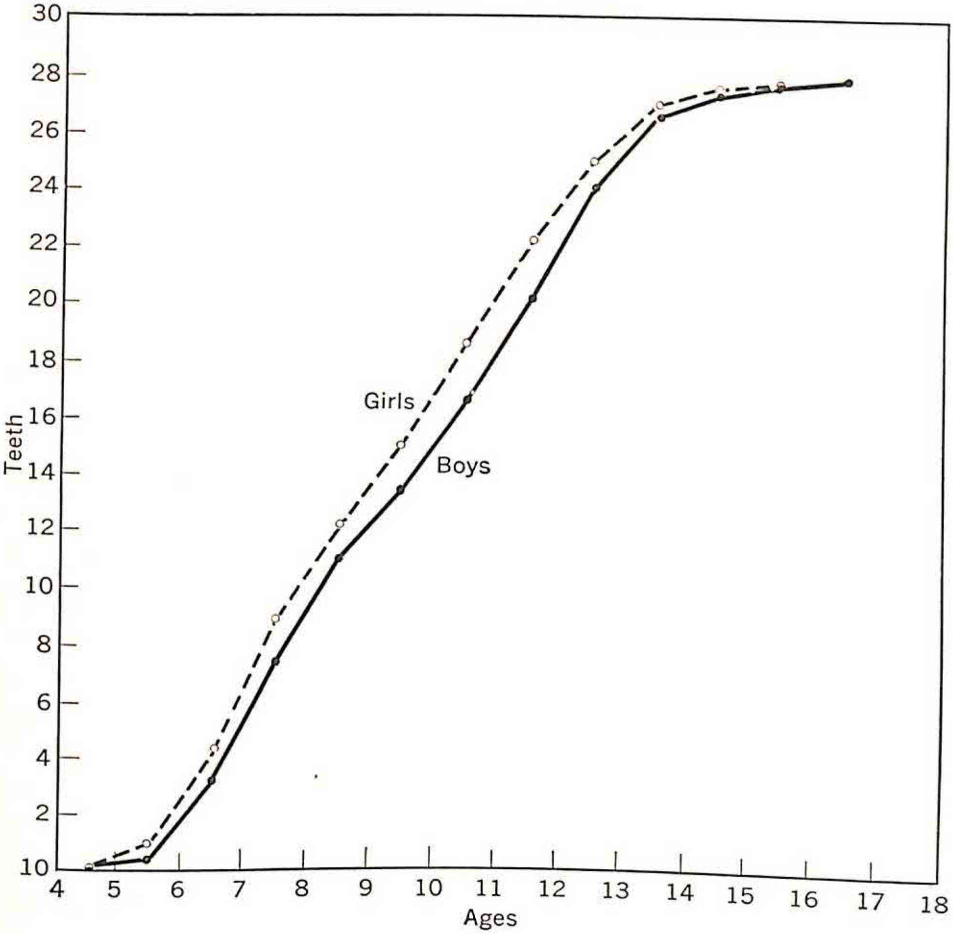

FIGURE 3-4. Average number of all permanent teeth (except third molars) erupted at specified ages

Another method of assessing a child's skeletal development is through determining the eruption of the permanent teeth. As a rule only six baby teeth appear during the first year of life, and the remaining fourteen come through during the eighteen months following. Thus, most children will have their baby teeth by the time they are two and one-half years of age, and no more teeth will appear until near the end of the fifth year when the permanent teeth begin appearing. The growth of the permanent teeth requires a longer period of time. The curve of growth follows the pattern set forth for height and weight, with the girls ahead of the boys at all stages until all the permanent teeth appear. The charts for the development of permanent teeth are shown in Figure 3-4.[13] These curves are characterized by a slow beginning, followed by an acceleration around the ages of eleven and twelve years—the preadolescent spurt.

Changes in muscles. The importance of the growth of the muscles is reflected in the increased strength and co-ordination that takes place with age. The muscles play an important part in the digestion of foods, the beating of the heart, and other necessary life functions. They also operate in the maintenance of posture and equilibrium. They are arranged in pairs so that they work opposite each other. In a program of physical development or in corrective work in posture, it is necessary to consider the relative strength of the different muscles. If one of a pair of muscles is stronger than the other, the natural symmetry of the body is likely to be affected, because of an unequal pull.

The rapid growth of the muscles is reflected in the gradual and in the continuous increase in the relative weight of the muscles of the body from early childhood to maturity. During infancy and early childhood years, they grow in weight largely in proportion to the increase in the total weight of the individual. There is, however, a significant increase in the relative weight of the muscles around five or six years of age. At eight years of age they constitute approximately one-fourth of the body weight; whereas at age sixteen they make up approximately 45 per cent of the total body weight.

Change in pulse rate. One physiological measurement that is easy to make is that of pulse rate. This, however, has little value in the hands of the average teacher. In extreme cases the individuals should be referred to a physician. The danger of the "force of the norm" appears in connection with the pulse rate. There is a decreased pulse rate as the individual child grows toward maturity.[14] This is shown in Figure 3-5 for boys and girls, taken under basal physiological conditions in connection with the Adolescent Growth Study at the University of California. The more rapid pulse rate for girls continues from childhood to maturity.

The decrease in pulse rate with growth toward maturity is related to changes in the proportion of the size of the heart to the body as a whole. There is a slow rate of growth of the size of the heart between the approximate ages of four and ten, so that around the age of seven it is smaller in proportion to the total body than at any other period. It has been suggested by a number of students of educational psychology that this disparity between the growth of the heart and the body as a whole should be taken into consideration in planning and directing physical activities for growing boys and girls. Caution should be observed in overstimulation of children in prolonged physical activities. Thus, periods of rest should be planned; however, the rapid rate of recovery of the child from fatigue makes it unnecessary to have long rest periods.

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[13] H. Klein, C. E. Palmer, and M. Kramer, "Studies on Dental Caries: II. The Use of the Normal Probability Curve for Expressing the Age Distribution of Eruption of Permanent Teeth," *Growth*, Vol. 1 (1937), pp. 385-394.

[14] Nathan W. Shock, "Physiological Changes in Adolescence," *Forty-third Yearbook of the National Society for the Study of Education*, Part 1, *Adolescence* (Chicago: Univ. of Chicago, 1944), p. 59. Figure 3-5 is reproduced by permission of the Society.

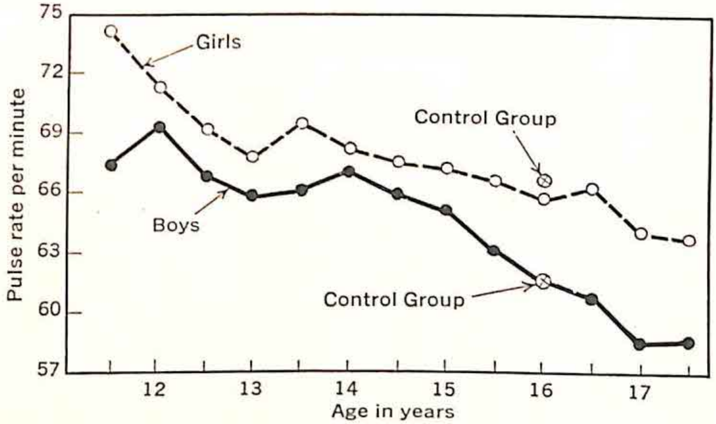

FIGURE 3-5. Age changes in basal pulse rate

The vertical lines through each point indicate ± 1 S.D. mean. The control groups refer to test scores on groups other than the experimental groups obtained at the age of sixteen, in order to provide a comparison between the experimental groups of boys and girls and a sample without earlier experiences in the laboratory procedures used on the experimental groups.

Ears and eyes. The ears and the eyes are extremely important in connection with the educational growth of children. The sense organs have at times been referred to as "the gateway to the mind." The child's impressions of the world about him are made possible through stimulation received by the sense organs. Since the eyes and ears are so important for the child's learning, teachers and others should be concerned about their development and protection.

At birth the child's ears are quite well developed. The major difference between the ear of the child and that of the adult is in the Eustachian tube which connects the ear with the throat. In the small child this is a short wide passage which makes the ears especially subject to infection from sore throats or colds. Thus, teachers should constantly be on the guard against throat infections which might have an adverse effect upon the child's hearing. Also, teachers should be alert to hearing deficiencies and should understand the educational and psychological needs of the hard-of-hearing child.

The development of binocular vision is closely related to reading readiness. In a good school program, children are given adequate visual tests to detect those whose vision is not ready for beginning reading, writing, and certain other school activities. It is important to protect the child's eyes from strain and other conditions which contribute to the development of visual difficulties.

GROWTH IN MOTOR ABILITIES

Motor growth cannot be separated from physical growth and development. It is contingent upon the individual's use of his physical equipment, and it cannot supersede the maturation of physical structure. It is often overlooked in the educational program since the school has often concerned itself primarily with those pursuits that involve intellectual attainments.

Pattern of motor growth. Motor growth follows the same principles and patterns as other aspects of growth. Certain motor skills are acquired at an early age and are learned in a relatively short time, while others are acquired at a later stage of maturity. Then, there are some motor skills which begin to develop at an early age but do not reach their peak until the individual has attained a fair degree of maturity.

Early movements of the infant are random in nature. However, reaching and grasping objects in his immediate environment appears during the early months, so by seven or eight months of age the child is able to grasp his rattle and other objects. In attempting to reach an object, the preferred hand takes the lead with the other hand following, since the infant is at this time reaching with both hands. Such action requires eye-hand co-ordination, or the working together of the muscles of the hands and of the eyes. Activities involving crayon and paper reveal levels of behavior at different stages of the child's development. These levels are in harmony with his neuromuscular maturation. This development has been described by Gesell from observation of children during the first five years of life.[15] During the first month the infant merely grasps the crayon without regard for marks that may be made on the paper. By the end of the first year he begins bringing the crayon into a sort of functional relationship with the paper, although the marks made are of a wavering type with little or no relationship between them. Growth in the use of crayons, after the first year, is of a gradual and continuous nature. This is further interrelated with other aspects of the child's growth as is revealed by his ability to imitate certain strokes and to copy materials. By the age of five he is able to copy a cross, a square, and like objects. The better co-ordinated movements involved in copying these materials emerge as a result of the maturation of certain physical characteristics, the development of the individual as a whole, and learning.

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[15] Arnold Gesell, *Infancy and Human Growth* (New York: The Macmillan Co., 1928), p. 216.

The behavior pattern of throwing was studied by Wild.[16] Thirty-two carefully selected children, a boy and a girl at each six-month age level from two to seven years and at each age level from seven to twelve years, were used as subjects for the study. An analysis of the arm and body movements involved showed typical age patterns. There was a definite trend toward better timing and better mechanical means for throwing. These changes were closely related to physical growth and development.

> Maturational factors are believed to be operative as the basic type patterns of throwing develop; learning, particularly after six years, greatly influences the skill pattern individuating out of and upon the basic growth stage; it may be the factor accountable for differences in performances, especially so evident between the sexes.

Growth in physical performance. A decrease in reaction time with age has been observed by a number of investigators. Using the Miles Reaction Board, Florence Goodenough reported the speed of reaction to a predominately auditory stimulus of subjects ranging in age from three and one-half years to adulthood.[17] There was a marked decrease of reaction time with age; however, the reduction of useless accessory movements and the decreased bodily tension were even more marked. This decreased speed of reaction is important in the development of a number of skills involving speed and precision.

Tests of strength, motor co-ordination, and flexibility during childhood reveal a constant and continuous increase with age. Relative strength has been expressed in terms of quotient, referred to as *physical fitness index*. Age and sex standards for elementary-school children show that there is a pronounced growth in strength during this period, so that the child of twelve is two or three times as strong as he was when he entered the first grade. Large muscle skills, involving the use of the arms or legs, mature more rapidly than do small muscle skills. A recognition of this is important in guiding school-age boys and girls in their motor achievement and development. However, there is no single best age to start the teaching of such motor skills as the use of the hammer, use of the scissors, sewing, and the like. Among children of any particular age level, there will be considerable differences manifested.

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[16] Monica R. Wild, "The Behavior Pattern of Throwing and Some Observations Concerning Its Course of Development in Children." Reprinted from *The Research Quarterly*, Vol. 9 (1938), pp. 20-24. (Copyright, 1952, by the American Association for Health, Physical Education, and Recreation, Department of the National Education Association, 1201 16th St., N. W., Washington 6, D. C.)

[17] Florence L. Goodenough, "The Development of the Reactive Process from Early Childhood to Maturity," *Journal of Experimental Psychology*, Vol. 18 (1935), pp. 431-450.

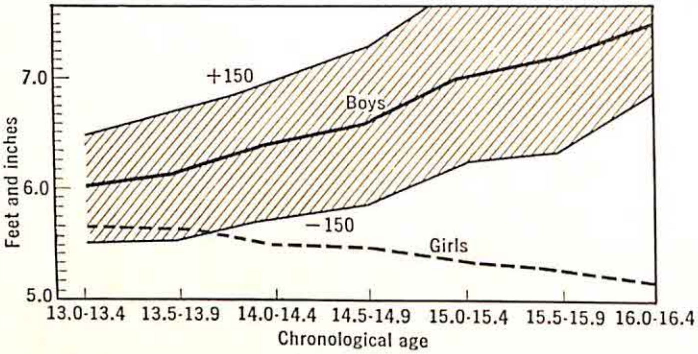

FIGURE 3-6. Comparison of boys and girls on the broad jump

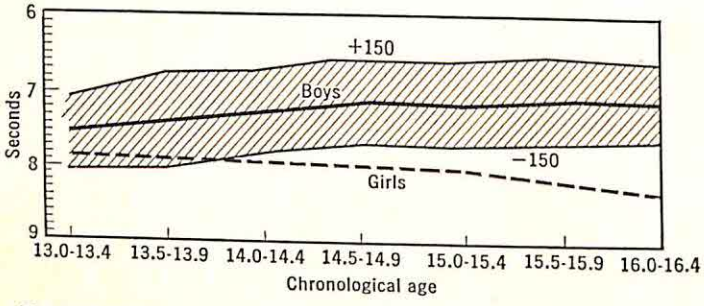

FIGURE 3-7. Comparison of boys and girls on the fifty-yard dash

Results from various tests of motor performances of adolescents, reported by Espenschade, show that the different traits do not develop at the same rate.[18] The average score of boys on the fifty-yard dash at age thirteen was almost as high as the average for the sixteen-year-old group. However, an observation of the curve of growth, shown in Figure 3-6, for the broad jump shows a considerable development after age thirteen. A gradual and continuous decrease in these abilities among girls is indicated by the curves presented in Figures 3-6 and 3-7. These activities are quite vigorous in nature, and competition is less keen among girls where strenuous physical activities are involved. The lack of motivation on the part of adolescent girls combined with differences between boys and girls in body build seem to provide a sound explanation for the continuous decline in these activities among girls after age thirteen.

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[18] Anna Espenschade, "Motor Performance in Adolescence," *Monographs of the Society for Research in Child Development,* Vol. 5 (1940), No. 1.

Interrelations of motor growth. It is a common observation that boys who excel in one sport tend to be proficient in and, oftentimes, excel in other sports. This relationship between different motor skills has led some to point out that there is a general factor present which may be regarded as potential ability or talent and that the amount of this will vary considerably from individual to individual within the same age and sex group.

TABLE 3-4. *Correlations between scores on various motor achievements of preschool children*

MEASURES CORRELATED	BOYS		GIRLS	
	NUMBER	CORRELATION	NUMBER	CORRELATION
Total Group				
Steps and ladders with ball activities	50	.54 ± .10	48	.72 ± .06
Steps and ladders with hopping, skipping, etc.	50	.69 ± .07	48	.79 ± .05
Ball activities with hopping, skipping, etc.	50	.69 ± .07	48	.47 ± .96
Younger Group (26 to 53 months)				
Steps and ladders with ball activities	16	.40 ± .21	29	.66 ± .10
Steps and ladders with hopping, skipping, etc.	16	.72 ± .12	29	.72 ± .09
Steps and ladders with hopping, skipping, etc.	16	.69 ± .13	29	.75 ± .08

There is much evidence for this in a study of the relationship between strength and other developmental traits. Significant correlations have been reported between strength of grip and such developmental traits as height, weight, physiological development, skeletal age, and interest in motor activities.[19]

The results of the study by McCaskell and Wellman conducted with preschool children as subjects offer evidence that a close interrelationship of different motor abilities appears at an early age.[20] The tests devised for their study were given to 98 children from two to six years of age. The selected activities were: ascending and descending ladders, ascending and descending steps, hopping, skipping, jumping, balancing on path and circle, ball-throwing, ball-catching, and ball-bouncing. The scores for the various activities were combined into common categories as shown in Table 3-4. Correlations obtained between these categories are high and statistically reliable, indicating a close interrelationship of these abilities even at this early age. This study also revealed sex differences in favor of boys for the steps, ladder, and ball activities; while the girls were superior on hopping and skipping. Since boys more frequently engage in activities involving climbing and ball throwing, while girls are more concerned with hopping and skipping, and jumping rope, one can conclude that these differences in motor skill are largely a result of practice.

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[19] See Harold E. Jones, *Motor Performance and Growth* (Berkeley and Los Angeles: University of California Press, 1949), Chap. II.

SUMMARY AND EDUCATIONAL IMPLICATIONS

The general pattern of physical and motor growth follows the principle set forth in Chapter 2. The wide range of differences found among children at any age level emphasizes the need for individual growth charts in interpreting a particular child's growth and development toward maturity. However, the early years are characterized by their rapid rate of growth in height and weight. A second period of accelerated growth in height and weight begins just prior to the onset of adolescence. Differences among children in their physical development are found in reaction time, strength, skeletal development, sexual maturation, as well as other aspects of physical and motor growth. On the average, however, there are fairly well defined patterns indicating that physical and motor growth tend to follow an orderly sequence. There are marked changes in the general body proportions with age. This may be observed in the case of the growth of the head, the legs, and the jaws.

Performance in various tasks involving motor skill increases fairly steady with age, with sex differences becoming more pronounced after the age of thirteen years. In the case of boys the most marked improvement in most athletic tasks, except for speed of running, comes after the ages of twelve and thirteen; however, in the case of girls there is in general a decline in ability following this age period. This has been explained as resulting from a lack of motivation and practice along with sex differences in body build. There is no one age level when it is best to begin to learn the different motor skills, although it is a fundamental educational principle that growth and learning cannot transcend maturation. A child of six may be taught certain skills relative to handling a ball; however, he will be limited in his development by various factors, including maturation. Certain fundamental principles of learning applicable to the acquisition of motor skills will be discussed in Chapter 13.

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[20] Carra Lou McCaskill and Beth L. Wellman, "A Study of Common Motor Achievements at the Preschool Ages," *Child Development*, Vol. 9 (1938), pp. 141-150.

There is a close relationship between skeletal growth and physiological development. This furnishes a basis for predicting the physiological development of the individual child. However, in all aspects of the child's physical and motor growth, the interrelation of heredity and environment are in evidence. Individual differences in height and weight among children from somewhat similar social and economic circumstances will be found in every classroom. However, there is a positive correlation between improved diets and different aspects of physical growth. The importance of physical and motor growth in the total development of the child is recognized in our modern educational program. The child develops as a unified whole; to neglect one aspect of his growth is to hamper his total development.

Questions and Exercises

1. Differentiate longitudinal and cross-sectional methods of studying the growth in height and weight of children. What are the advantages of each method?
2. Observe a group of twelve-year-old pupils. What do you find relative to individual differences in physical development? What do you find relative to sex differences? How would you account for the differences between the largest and smallest girl of the group?
3. How is posture related to physical and motor growth? Do you think that teachers should be concerned about the posture of school children? Give reasons for your answer.
4. Show how individual growth curves may be helpful in evaluating the growth of a child.
5. Show how the fundamental principle that the child develops as a unified whole operates in connection with physical and motor growth.
6. List school conditions which are sometimes hazards to the optimum growth of elementary-school children.
7. Trace changes in body proportions from birth to adulthood.
8. What problems sometimes emerge as a result of the differential rate of development of boys and girls?

9. Read the article by S. A. Courtis, "Maturation as a Factor in Educational Diagnosis," *Thirty-Fourth Yearbook of the National Society for the Study of Education* (1935), pp. 177-178.
   a. Describe the four cycles of growth presented by Courtis.
   b. Cite evidences from your observations or from other studies for or against these four cycles of growth.

Recommended Readings

Breckenridge, Marion E., and Vincent, E. L., *Child Development*, 2nd ed. (Philadelphia: W. B. Saunders Co., 1949), Chap. VII.

Cole, Luella, *Psychology of Adolescence*, 4th ed. (New York: Farrar and Rinehart, 1954), Chap. II.

Dearborn, W. F., and Rothney, J. W. M., *Predicting the Child's Development* (Cambridge, Mass.: Sci-Art Publishers, 1941), Chaps. I-IV.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Co., 1952), Chap. V.

Garrison, Karl C., *Psychology of Adolescence*, 4th ed. (New York: Prentice-Hall, Inc., 1951), Chap. III.

Gates, A. I., *et al.*, *Educational Psychology*, 3rd ed. (New York: Macmillan Co., 1948), Chap. III.

Hurlock, Elizabeth B., *Child Development*, 2nd ed. (New York: McGraw-Hill Book Co., 1950), Chap. V.

Johnson, R. L., and Kelly, H. G., "Growth Charts for Use in Pediatric Practice," *Journal of Pediatrics*, Vol. 27 (1945), p. 215. Useful charts are given which will enable the advanced student to explore further their use in research and practice.

Millard, Cecil V., *Child Growth and Development in the Elementary School Years* (Boston: D. C. Heath and Co., 1951), Chap. IV.

Olson, Willard C., *Child Development* (Boston: D. C. Heath and Co., 1949), Chap. III.

Thompson, Helen, "Physical Growth," in *Manual of Child Psychology*, L. Carmichael, ed. (New York: John Wiley and Sons, 1946), Chap. V.

Thorpe, Louis P., *Child Psychology and Development* (New York: The Ronald Press Co., 1946), Chap. VII.

CHAPTER 4

The Development of Emotional Behavior

THE CHILD responds emotionally as well as physically to the various forces and conditions with which he is confronted. Two children from the same family, brought up in a very similar environment, will respond differently to emotional stimuli. The nature of their responses will be determined in part by the unique constitution which each has inherited, in part by his past experiences, and in part by his physical and mental characteristics, at the particular time. It should be pointed out, however, that the emotional development of the child is not distinct and separate from other aspects of growth. It was suggested in Chapter 2 that all growth is interrelated, and that the child grows as a whole. The distinctions made between the different aspects of growth are given in order to focus the attention of the student upon specific phases of the child's growth and thus to develop a better understanding of the nature and characteristics of the child's development.

THE GENESIS OF EMOTIONAL BEHAVIOR

The nature of emotions. The word emotion was derived from the Latin word *emovere,* to move out. It may be described as a stirred-up state or condition. An emotional response involves a more or less clearly defined feeling state such as fear, envy, jealousy, love, and certain internal organic changes related to the circulatory, glandular, and digestive systems.

Genetic studies of child development reveal that differences in emotionality appear during the first months after birth. However, the concept that the emotions are causal agents is open to serious question. The emotions can best be described as responses developed through the continuous interaction of the child's innate constitution and environmental forces and conditions. Since they are responses to stimulating conditions, they are not in themselves causal agents to action. The emotional habit established may, however, be conceived of as a sort of drive or readiness for responding in certain ways to particular situations. One may, for example, ask the question: "Why does a particular child cry when a dog appears?" and then receive the answer, "Fear causes him to cry." No clear explanation has been given. The question may be asked: "Just what is this fear that causes him to cry?" The crying and withdrawing behavior are responses to the stimulating conditions. The excited state of the child is part of that total complex which we define as the emotion.

Early emotional behavior. Our lack of a clear understanding of the nature of the emotional experiences of the newborn child has led to much speculation. Attempts were made by earlier students of genetic psychology to ascribe specific emotional responses to certain types of emotional stimuli during infancy. More recent observations of the emotional responses of infants have led to the viewpoint that the infant is poorly endowed emotionally. However, potentialities for emotional development exist. Soon after birth he exhibits a primitive sort of emotional excitement to intense stimulation in the form of such behavior patterns as crying and startle responses.

The infants's cries are accompanied by vigorous bodily movements which include the entire physical organism.[1] But there is no sound basis for concluding that intense feelings accompany such movements. It has been noted from experiments performed with babies as subjects that the infant is relatively less affected by stimuli that arouse pain than older children. Furthermore, many infants fail to respond to restraint, loud noises or other intense forms of stimulation. The infant, during the early days of life, exhibits much behavior that seems to have an emotional quality; however, these responses show much of the same lack of differentiation found in other aspects of his behavior at this period.

Startle movements. The startle pattern may appear among infants in response to a loud sound, bright light, sudden withdrawal of support, and to having his arms held tight by his side. The startle movements thus produced have at times been termed emotional responses. They are typified by muscular flexion. This includes a flexion of the arms and fingers, a forward movement of the head, and a raising of the shoulders. Studies of the bodily reactions of infants to an auditory stimulus, by Clarke, showed that certain changes appeared during the first several months of life.[2] Children three or four months of age reacted with more of a jump, and moved definitely in the direction of the sound. The responses most characteristic of the early weeks were the Moro reflexes or the startle reflexes in which the infant throws out his arms and then brings them back as if in embrace.

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[1] W. B. Cannon, *Bodily Changes in Pain, Hunger, Fear and Rage* (New York: D. Appleton and Co., 1929). This is a classic study of the physiological changes accompanying emotional responses.

This early startle reaction was previously defined as an emotional response to a loud sound. It seems more reasonable to consider this as a type of reflex behavior exhibited by the infant child during the early weeks when the cerebral cortex is not functioning to any perceptible degree. The "involuntary" grasping and startle reflexes of the young child tend to recede as the child develops and becomes increasingly capable of voluntary control. However, many reflexes appear in a sort of a behavior pattern in emotional responses as the individual child develops toward maturity.

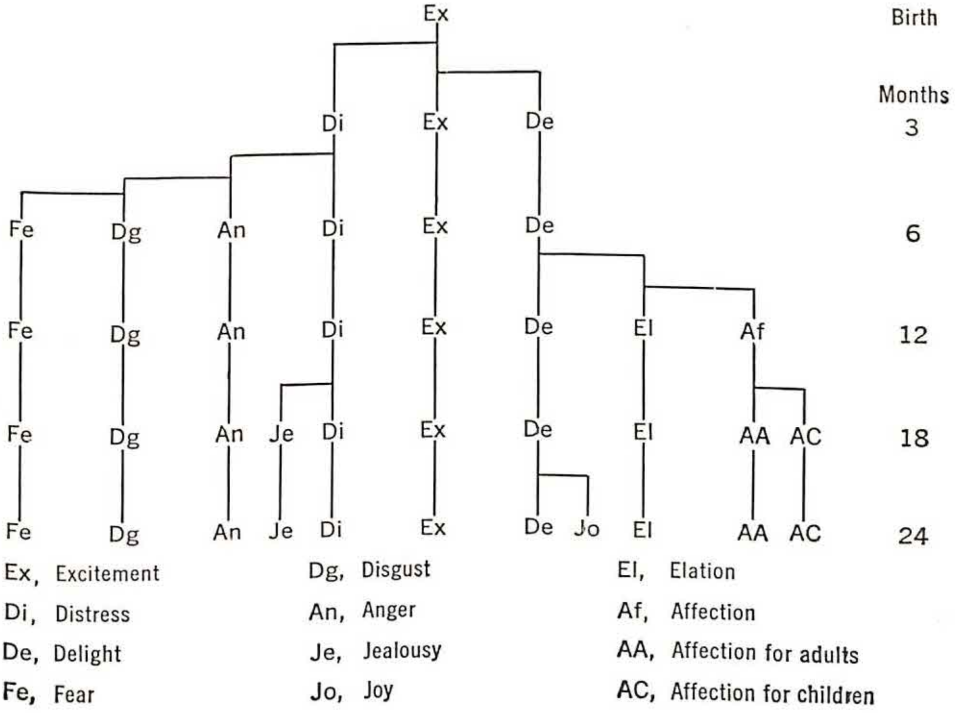

FIGURE 4-1. The approximate ages of differentiation of the various emotions during the first two years

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[2] Frances M. Clarke, "A Developmental Study of the Bodily Reactions of Infants to an Auditory Stimulus," *Pedagogical Seminary and Journal of Genetic Psychology*, Vol. 55 (1939), pp. 415-427.

discovery was that when two stimuli—meat, which natively stimulated the flow of saliva, and the ringing of the bell, which elicited no salivary response—are presented simultaneously, to the dog, a number of times, the ringing of the bell evokes the salivary response, even in the absence of the meat. This principle, when applied to child development, would indicate that when a conditioned stimulus is associated with an original stimulus a number of times, the conditioned stimulus will evoke the response produced by the original stimulus. This reaction to a stimulus-object that had not previously produced such a response has been termed the conditioned response.

The most widely publicized experiments on emotional conditioning are those conducted by Watson and his associates at Johns Hopkins University.[4] The results from observations of Albert B., an even-tempered eleven-month-old boy, is significant in this connection. Albert B., who was originally not afraid of a white rat, was taught to show a fear response at the sight of a rat. After it was observed that Albert displayed withdrawal and crying responses to a loud sound produced by striking a heavy steel bar, Albert was shown the white rat at the same time that a loud noise was produced. After this was done a number of times, Albert displayed fear responses at the sight of the rat without the stimulation of the loud noise. This is a conditioned response established in relation to a stimulus which did not previously provoke the reaction. This and similar experiments furnish evidence that many early fears are learned through the conditioning method.

The role of imitation. There is scientific as well as empirical evidence that many of the emotional responses of children develop through learning involving imitation. A child brought up by a fond mother who displays considerable fear of lightning will in all probability acquire the same patterned type of emotional responses to lightning. Such emotional expressions have often been explained through heredity; however, there is no direct evidence that such expressions develop as a result of the unfolding of hereditary characteristics. Heredity appears to establish general limitations rather than specific patterns of behavior. Certainly many of the child's emotional expressions are acquired through association with his parents, teachers, peers, and others. It should be emphasized, however, that the ability of a child to imitate is limited by his past experiences and mental maturity. Imitation of the emotional responses of the mother are elements of the child's repertoire of behavior.

Emotional expressions and learning. It was pointed out earlier in this chapter that specific patterns of emotional responses appear at different age

[4] John B. Watson and R. Raynor, "Conditioning Emotional Reactions," *Journal of Experimental Psychology*, Vol. 3 (1920), pp. 1-14.

levels. Thus, the problem of the importance of maturation and experience in the development of emotional behavior appears. Does the process of maturation give rise to the emergence of emotional patterns of behavior, or are these emotional patterns largely a result of experience? The importance of maturation in the physical and motor growth of the child was presented in the previous chapter. Since maturation is essential for the growth and development of the child, it would appear that it is closely related to the development of emotional behavior. Sometimes this influence may be rather indirect in nature. The development of the ability to understand a specific situation better may lessen or increase a child's fear of the situation. The growth of strength and motor co-ordination to cope with a physical situation may in itself eliminate the child's fear of the situation. Likewise, the kind of fear or anger produced may depend in large measure upon the stage of the child's maturation. It is essential, therefore, for the teacher or parent to consider the stage of the child's maturation in their efforts to cope with conditions and situations productive of emotional responses.

The importance of learning in the development of emotional behavior should be recognized by teachers and others concerned with the guidance of children. There is good evidence based on research that emotional behavior is a product of environmental circumstances. It, then, becomes the task of the home and school to so organize and direct experiences of the child that favorable rather than unfavorable emotional responses are acquired. Concerning the learning of emotional expressions, genetic studies of child development indicate the following:

1. Differentiation of emotional behavior emerges early in life. This differentiation increases as the individual develops toward maturity.
2. Individuality of emotional behavior appears at an early age. This tends to increase as each individual matures and learns effective ways of meeting emotional situations.
3. The emergence of specific patterns of emotional behavior is closely related to the needs of the individual. Those forms of behavior which brings forth the greatest satisfaction tend to be repeated and to become a part of the total behavior pattern.
4. There is a definite relationship between the stage of a child's maturation and the nature of his emotional response.

CHANGES OF EMOTIONAL BEHAVIOR WITH AGE

Considerable data are available, based upon studies of child development, relative to the emotional characteristics found among children at different age levels. Such differences may best be accounted for through differences in heredity, maturation, and experiences. As a result of maturation and experience, an individual child will respond differently at different age levels. At ten years of age certain stimuli which formerly produced an emotional response will be very weak; however, at this age certain stimuli which formerly produced no emotional response may produce emotional behavior of varying degrees of intensity. These changes are indicated in Figure 4-2.

Crying of children. The crying of the six-week-old baby is a result of internal causes, with hunger usually leading the list. By the time the infant is four months old, however, his crying behavior may be set off by outside conditions, such as handling by strangers. The child oftentimes cries at this age in order to get the attention that he has become accustomed to receiving. Through experience he has learned that this form of emotional expression will satisfy his need for attention, which has, by this time, become important to him in his daily life.

There is not only a change in the nature of the stimulus that provokes crying during the early months of life, but there are changes in the nature of crying as well. With the development of specific types of responses, the child tends to cry less with the body as a whole. Crying at one year of age may take the general form of fussing, tossing, and the like. The effects of learning have by this time produced changes in the nature and intensity of the crying response. This may be noted from a comparison of the crying of Hopi Indian children with white American children. In American culture there are many restrictions and prohibitions in the rearing of children that tend to produce frustrations and prolonged crying behavior. In contrast, there is no feeling among the Hopi that crying is to be expected among infants, as there are very few prohibitions and little adherence to routines.[5] The American child soon after birth is placed on a schedule for feeding. Many infants begin crying some time before the hour of the next feeding. The Hopi infant, on the other hand, is nursed as soon as he becomes restless and begins crying. Although differences in culture may determine some of the conditions that provoke crying and may affect the pattern of crying, there is still considerable similarity in the crying responses exhibited by children from different cultures. The hungry infant frets, fusses, shows excessive bodily movements, and vocalizes, regardless of his culture.

As children progress toward the school years, social pressure tends to reduce the amount of crying. Contacts with other children have an important

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[5] See Wayne Dennis, *The Hopi Child* (New York: D. Appleton-Century Co., Inc., 1940).

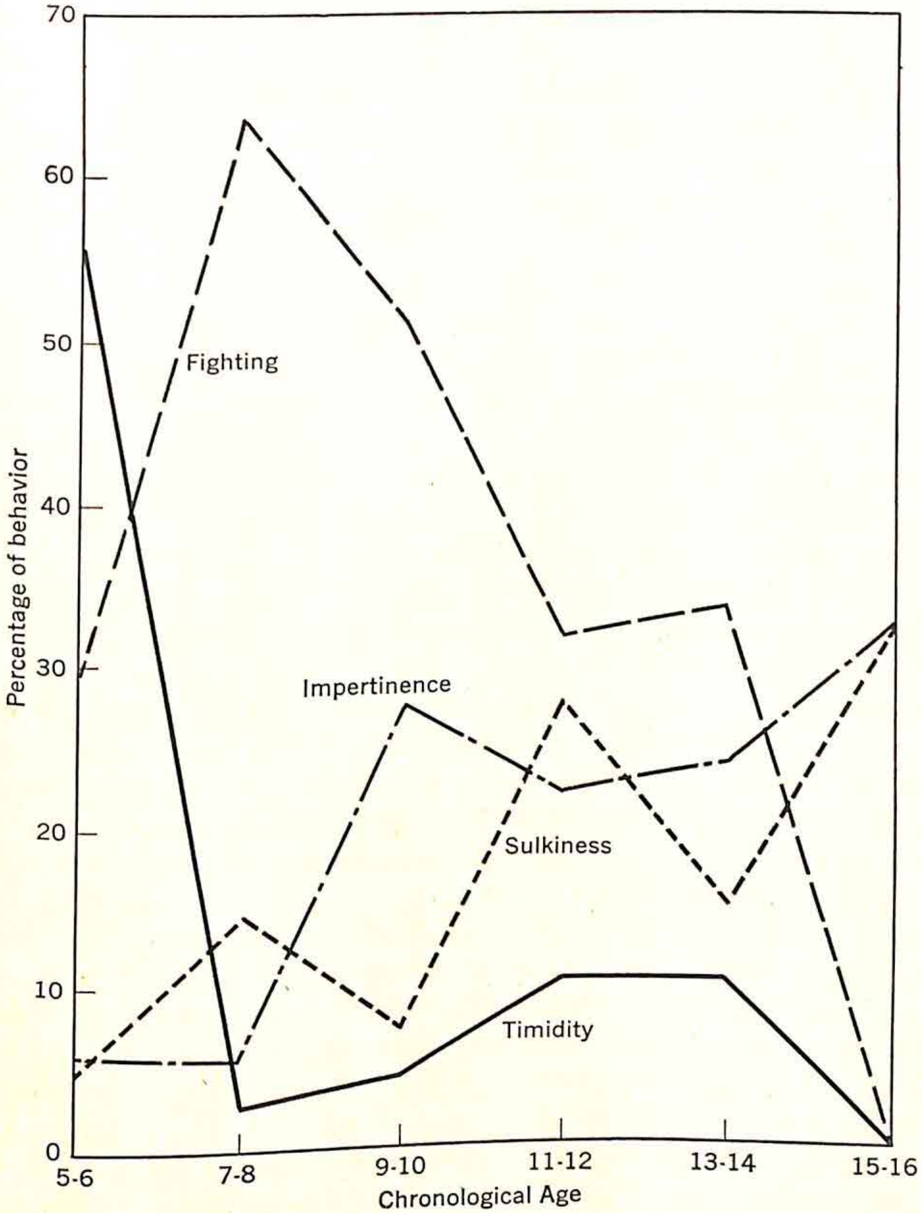

FIGURE 4-2. Changes of behavior with age

(W. E. Blatz, S. N. F. Chant, and M. D. Salter, *Emotional Episodes in the Child of School Age.* University of Toronto Studies, Child Development Series, No. 9, 1937) effect in this connection, especially among boys where the social pressure exerted is more intense in nature. Children also learn to refrain from crying because of some physical injury. By the time the child is eight years of age social pressure is sufficiently great to keep most children from crying. The continued growth in restraint from crying characterizes the child as he passes beyond his eight-year level into preadolescence and on to adolescence. It is during this time that cultural forces operate to intensify sex differences in the amount of crying exhibited.

The expression of fear. It has already been pointed out that emotional growth is closely related to other aspects of growth. As the child matures, there is an expansion of his emotional responses into new areas. Many of the earlier emotional responses are modified in favor of new ways of responding, while emotional responses now appear in connection with certain situations that formerly did not exist. This is observed by Jersild and Holmes in their studies of the nature of children's fears during infancy and early childhood.[6] The fear responses of preschool children to eight experimentally-created fear situations were recorded and studied. In the eight fear situations a definite and consistent decrease in the display of fear with age was observed. No fears of loud noises and snakes were recorded for the two-year-old children; while fear of a dark room, high boards, falling boards, and being left alone appeared at all ages studied.

While there is a steady decline in certain fears with age, other fears increase. Gesell found that six-year-old children were afraid of physical dangers, such as storms, fire, thunder, witches, and ghosts.[7] Also, the child's awareness of specific types of dangers influences the nature of his fears. Rural children may be afraid of mean horses and bulls but are not likely to fear elephants and tigers. With growth, adolescent fears of a social nature become prominent. A study by Hicks and Hayes showed that 50 per cent of a group of 250 junior-high-school students indicated that they were afraid of something.[8] Many of the fears reported were an outgrowth of fears developed during early childhood such as fears of snakes, dogs, the dark, storms, high places, and being left alone. However, the older children and adolescents showed much more concern over peer approval, failure in school, and being disliked. There is good evidence that many childhood fears tend to persist throughout life.

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[6] Arthur T. Jersild and Frances B. Holmes, *Children's Fears* (Teachers College, Columbia University: Bureau of Publications, 1935).

[7] Arnold I. Gesell and Frances Ilg, *The Child from Five to Ten* (New York: Harper and Bros., 1946).

[8] J. A. Hicks and M. Hayes, "Study of the Characteristics of 250 Junior-High-School Children," *Child Development*, Vol. 9 (1938), pp. 219-242.

The expression of anger. The startle pattern of the infant when his hands are held together or held down by his side has been defined as an early anger expression. This early response pattern is characterized by considerable muscular tension in which the infant arches his back, thrusts his arms and legs into the air, and cries in a forceful manner. According to observations by Gesell an infant may display a tantrum of the first magnitude at eighteen months of age.

Resistant behavior appears as part of the anger response around the age of twenty-one months or two years. Objections to routine physical habits such as dressing, bathing, eating, and the like, account for many of the anger outbursts in infants. Beginning with infancy the child is gradually and continuously asserting himself in his efforts to grow in independence. Unfortunately, many parents fail to realize the necessity for the individual to grow from complete dependence to almost if not complete independence. At two years of age many anger responses appear in connection with interferences imposed upon his physical activities or with his possessions. At this time his reactions are likely to be more violent and sometimes show evidence of destructiveness. Difficulties often occur as a result of the egocentric nature of the child at this period. Children's play activities are still of an individual nature and clashes over toys, places to play, things to do, and the like, are almost inevitable when children are brought together at this age.

There are many clinical findings from the observations of psychologists and psychiatrists which help to furnish a picture of the sequence of the development of anger expressions throughout the elementary-school years. In general, it has been observed that children in the elementary school pass through a period of loudness, boasting, and attempts to show off. They tend to challenge those who would exercise authority over them. This oftentimes brings them into direct conflict with parents and teachers, since they are likely to be impatient of those who would challenge their authority or even good judgment. Faced with adjustments to the school program, to their peers, and to the competitive activities outside of class the preadolescent is often frustrated in his endeavors. When they are unable to meet these needs with a fair degree of adequacy, outbursts of anger may be expected.

The weight of available evidence favors the viewpoint that the emotion of anger is a result of some goal-seeking activity. Significant data gathered by Meltzer from college students of situations or conditions provoking anger during a period of one week revealed that in about 86 per cent of the situations listed frustrations were involved.[9] A very small percentage of the frustrations presented in Table 4-1 were of organic needs. The majority of college men's frustrations were concerned with physical things, while 64 per cent of those for college women were with persons.

TABLE 4-1. *Frustrations and anger in men and women college students*

	MEN PER CENT	WOMEN PER CENT
Thwarting of self-assertion:		
Defense reactions to persons	29	45
Aggressive reactions to persons	7	19
Defensive reaction to things	47	26
Thwarting of organic needs	6	5
Complex situational thwarting	12	5

The development of jealousy. The development of jealousy follows a course somewhat similar to that of anger, although it does not manifest itself as early in life and appears to result from more complex situations. Jealousy may well be regarded as a response to situations established as a result of certain frustrations and inhibitions. It is a response involving the expression of anger, and perhaps fear, directed at persons or objects that threaten to take away something, to suggest the obligation to share something, or interfere with what is felt to belong to oneself. It appears early in the life of the child when a new baby appears who seems destined to absorb the mother's love and attention which the older child had all to himself. It also appears as the child grows and a brother or sister appears to be more favored than the other. The responses to the situation provoking the feeling of jealousy will vary considerably from child to child, depending upon maturation, past experiences, and present circumstances.

It has already been suggested that fear and anger are present in the emotion of jealousy. These feelings are usually combined with self-pity and grief, making the expression of jealousy a rather complex emotional expression. The expression of jealousy may take various forms, especially on the part of the intelligent child and the mature individual. Sometimes aggressiveness at school may be the result of jealousy on the part of the child toward a sister, brother, or some other person in the home situation. This aggressiveness may manifest itself in the child's lying, stealing, intense school efforts, attachment to some person at school, or in the form of vulgarity. Just as many acts of superiority may be an outgrowth of jealousy, likewise many forms of maladjustments are rooted in jealousy.

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[9] H. Meltzer, "Students' Adjustments in Anger," *Journal of Social Psychology*, Vol. 4 (1933), pp. 285-309.

Sympathy. Sympathy is a complex form of emotional experience whereby the individual attempts to put himself in another's place and share his feelings and emotions. Although the ability to express sympathy is not a natural form of development, it is closely related to maturation. The small child will be unable to show much sympathy, since he is unable because of mental immaturity as well as lack of experiences to place himself in the position of the other person. However, the young child will show much concern for others, such as his mother. He may cry when she cries and laugh when she laughs; but this is not a genuine expression of sympathy.

Another factor essential for growth in sympathy is the development of social awareness or social consciousness. It will be pointed out in Chapter 7 that the small child is egocentric in nature, and social consciousness develops as a result of maturation and favorable social experiences. Unless an individual acquires this he will likely be unable to forget himself and thus depart from his own egocentric self sufficiently to place himself in the position of the other person. Individuals too completely wrapped up in the *self* are incapable of expressing much genuine sympathy.

Individuals who have had somewhat similar experiences to one with whom they are sympathizing will be able to express their concern in a more realistic and genuine manner than will people without these experiences. The nine-year-old girl in a happy home, with her father and mother living together, will find it most difficult, if not impossible, to express sympathy for a classmate whose father was killed in an automobile accident.

There are cautions that adults should observe in the expression of sympathy for children. All sympathy should be genuine, and even the small child soon recognizes that which is formal and hypocritical in nature. Again, the expression of sympathy should be handled in a socially desirable way. The child is embarrassed when exposed to "mushy" expressions or an overprotective attitude. The child wants and needs assurance but not the type of consolation which hurts his pride and deprives him of his own independence. Stereotyped emotional experiences such as "poor little child" provides little assurance or help to the child in sorrow.

Decline with age in overt expression. Along with increased differentiation of emotional expressions there is a gradual decline in the exhibition of overt actions. The subdued forms of expression tend to replace the more violent uninhibited forms. The child who at eight or nine months of age kicked and cried with the "whole self" will by the time he is seven years of age withhold most of these outer expressions and reveal his emotions in more subdued and subtle ways. Two psychological assumptions have been set forth and supported with scientific studies as an explanation for the uninhibited expressions and lack of emotional control among infants and children.

1. The infant is essentially a precorticate organism, and the establishment of cortical control, especially in the frontal lobe, is not achieved until adulthood.
2. The infant is relatively lacking in endocrine products which sustain some of the physiological responses to stress.[10]

The school-age child is not so likely to display his emotions directly in behavior related to his feelings. His emotions may be detected by such symptoms as restlessness, negativism, cruelty, excitability, fidgeting, nervous habits, and the like. An interesting study of the symptoms of emotional behavior manifested by school-age children in England was conducted by Cummings.[11] His results are presented in Table 4-2. It is apparent from these results that children frequently display states of anxiety and

TABLE 4-2. *Incidence of symptoms of emotionality exhibited by school children*

BEHAVIOR SYMPTOMS	PERCENTAGE FREQUENCY
Excitability, restlessness	28.9
Daydreaming, lack of concentration, laziness	28.9
Generalized anxiety, timidity, or shyness	23.0
Specific fears	22.2
Bladder control, frequency of micturition	21.3
Nervous habits	18.0
Cruelty, aggression	15.1
Speech difficulties	14.2
Lack of appetite, food faddiness	11.3
Babyish behavior, frequent crying	11.3
Lying, stealing	10.1
Tendency to constipation, headache, stomach-ache	9.2
Obstinacy, disobedience	8.8
Bedtime problems	7.1
Undesirable sex habits	6.3
Easily and frequently tired	4.6
Obsession	4.2
Hysterical outbursts	4.2

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[10] W. A. Bousfield and W. D. Orbison, "Ontogenesis of Emotional Behavior," *The Psychological Review*, Vol. 59 (1952), pp. 1-10. By permission of the journal and the American Psychological Association.

[11] J. D. Cummings, "The Incidence of Emotional Symptoms in School," *British Journal of Educational Psychology*, Vol. 14 (1944), p. 155.

daydreaming. Furthermore, many of the nervous habits may be traced to anxiety states. The boys displayed more symptoms of emotionality than did the girls.

DIRECTION AND CONTROL OF EMOTIONAL BEHAVIOR

The capacity for emotional expansiveness on the part of the growing individual is limited. The range of possible development of emotional expressions on the part of the individual will depend to a very large extent upon environmental experiences; and healthy emotional development requires that the child's emotion be channeled and directed into worthwhile activities. The subsequent discussion will present ways of directing the emotional growth of the individual child toward emotional maturity and well-adjusted personal and social adjustment.

Understanding and accepting the child's feelings. In order to deal effectively with the development of the child's emotions we must understand the conditions under which they appear. An emotion may be aroused from stimulation in the environment or in the individual himself. A stimulation which threatens to damage one's pride, to threaten one's well-being, or to bring injury to the self, brings forth *negative* emotions, such as fear, anger, anxiety, jealousy, and the like; while *positive* emotions such as love, joy, and delight occur in relation to stimulation which promises to enhance one's well-being, pride, or self-realization.

The development of the dynamic concept of the child has produced desirable changes on the part of teachers and parents toward the forces motivating child behavior. A recognition of the importance of needs, aspirations, and goals has led to a better understanding of much behavior that was formerly conceived of in terms of instincts, special inherent characteristics, or reasoning.[12] When this approach is followed, much of the behavior formerly thought of by the teacher as inconsistent becomes more consistent, and behavioral expressions are better understood in relation to actual situations. When the child's interpretations and feelings about a situation are clearly understood, the teacher or parent will display a less critical attitude toward him, and will demonstrate an increased interest in helping him resolve conflicts and reach a favorable solution to his difficulties and problems.

Control through example. It was suggested earlier in this chapter that emotions developed through imitation. Thus, the teacher who desires to train the child to face an emotional situation in a desirable manner should first of all set forth a good example. Small children in particular learn a great deal from the examples set forth by their teachers. This is one of the fundamental reasons why teachers of this age-group should be well-adjusted and manifest desirable emotional habits. The teacher who is able to remain calm under stress, such as an air-raid drill, will influence the pupils with whom she is in contact to remain calm. The teacher who displays prejudice toward different religious and minority groups will tend to build up the same attitude in her pupils. The contagious nature of the emotional expressions and development makes this a most important means for educating the emotional nature of growing children.

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[12] See L. J. Lee, "On Being Afraid of Being Afraid," *Childhood Education,* Vol. 28 (1952), pp. 197-200.

Control by avoidance. The simplest means of controlling undesirable emotional behavior is through the avoidance of stimuli which provoke such behavior. It is obvious that this method cannot be used in a large percentage of emotional situations; however, there are conditions in which this is a desirable procedure to follow. Children may be taught to avoid low-level emotional stimuli which lead to anger outbursts, crying, and excessive fears. Children may be taught to abstain from reading certain materials, or going to certain movies which instill hate and prejudices. Perhaps this method may be held up as desirable as a means of helping children develop emotional control during the early years when habits of control are not yet firmly planted.

Control through relaxation. A promising method for controlling the emotions is through relaxation. This is closely related to the use of recreation as a means of controlling the emotions. It is well known that young children of elementary-school age respond readily to changes in the social atmosphere of the classroom. If the teacher is tense, autocratic, and domineering the children will be more tense and in a state of readiness for heightened emotional expressions. Whereas, in the classroom where there is greater freedom and the teacher displays a friendly attitude toward the pupils, there will be less bickering, and fewer emotional episodes. Again, the teacher exercises considerable control through the type of schoolroom setting which is developed.

Control through successful performances. One of the beneficial effects to be obtained from the early development of motor skills is that of attaining greater self-confidence. The child who is insecure on the playground or in the schoolroom will resort to fear and anger when confronted with an emotional situation. However, the child who has experienced success in meeting difficult situations will attempt to find some desirable means of overcoming a difficulty. The extent to which fear may be overcome by developing self-confidence and the ability to cope with the fear situation is clearly revealed in the pen-portraits of Disraeli, an exceedingly shy person, by André Maurois.

> In Disraeli's case it was a shyness started in childhood, born of petty persecution at school, fomented beneath a mask of apparent audacity by the hostility of his peers, then lessened during the years of his maturity by friendships, and at length cured by the exercise of power, but which had modelled his character and had impregnated every element in it. In particular, it had prevented him from ever finding real pleasure in the society of others. To feel that he was ever their equal, he had to be their leader.[13]

The graded approach in the promotion of competence will often help the child grow accustomed to meeting the feared stimulus by degrees. For example, the child who is afraid to recite in class may be helped by having him answer simple and short questions which he is well prepared to answer. There are many ways to help the child establish confidence in meeting a fear stimulus. The gradual approach may be used in helping the child to overcome fear of some imaginary situation. Whatever helps a child to understand and make use of his own resources and to evaluate the fear situation with which he is confronted should prove beneficial. A better understanding of the fear situation is often helpful. The child who is afraid of dogs in general may be aided through a study of the behavior of dogs, their ways of living, and general habitat.

Control by reconditioning. The conditioned process for the establishment of an emotional response to a particular situation was described earlier in this chapter. The retraining process is directed toward changing the emotional response, or unconditioning the response already established rather, than toward the formation of a new emotional response. In this case the child who has built up a fear reaction to some situation such as reciting in class associates some pleasant experience with the reciting. Perhaps the child is given a prominent part in planning some unit of work. The association of leadership which the child desires with a form of reciting is beneficial in retraining the emotions so that the child will display less fear in classroom situations involving reciting before the other members of the class. There has been considerable controversy over the effectiveness of the retraining method, which is referred to here as rconditioning; however there is good evidence that the association of a pleasant experience with an otherwise unpleasant one may be effective in reducing the emotional reaction to the emotional stimulus.

Control by discipline. It is not sufficient to merely tell a child that she should not lose her temper or should not display fear of a nonpoisonous snake. The child knows, or at least has usually been told on other occasions, that she should not lose her temper. However, self-control and discipline are learned as a result of experiences. The child who gives up readily to an emotional stimulus is learning to display rather than control the emotions. There are, however, certain dangers which may accompany overdiscipline which leads to conflicts and frustrations. Discipline, when understood and gradually self-imposed, will lead to emotional control. The best evidence of emotional maturity on the part of the individual is the extent of self-control which he has established. Much self-control is actually affected by forces beyond the self, such as social pressure. Also, self-control may develop as a result of efforts to reach particular goals. The child may be motivated to have the friendship of other children or of the teacher, and this may be sufficient to him to establish habits of self-control in relation to emotional stimuli.

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[13] André Maurois, *Le View de Disraeli* (Paris: Grasset, 1927), p. 187.

Self-control can result from the attainment of a philosophy of life which calls for discipline and a certain amount of restraint. This form of self-control does not appear among younger children, but appears among adolescents as a result of the development of ideals and standards. These ideals become the guiding force, and the individual exhibits self-control in harmony with the nature and intensity of such ideals. Ideals of loyalty or justice may cause the adolescent boy to so control and direct his behavior that fear of disapproval loses its potency. Emotional maturity in such a case emerges from the development of a unified philosophy of life.

Neurotic fear. There are certain fears which are not justified by reality and which do not yield to the reassurances coming from experiences and learning. These fears have at times been termed *neurotic fears*. Teachers and parents do not ordinarily have the training and experience which enables them to cope with such fears; thus specialized services should be sought. Too often an attitude of reproof and blame is taken rather than one of sympathy and a desire to help the individual concerned. The child suffering from such a condition has developed specific fears as a result of his experiences. In most cases they respond favorably to treatment at the hands of one who understands their problems and has an intense desire to be of help to them. A further discussion of these and related problems will be presented in Chapter 10.

SUMMARY AND GENERALIZATIONS

The early emotional reactions of the child are largely undifferentiated. The generalized excitement found in crying, laughing, and other emotional expressions tends to become less vigorous and involves less of the body as a whole as the child develops. The emotions of young children tend to center around objects, persons, and particular situations; while the emotions of the older children involve happenings, social situations, failure, and future events. The extent to which the child's emotions have moved out from the self and involve the activities and welfare of others is a measure of his emotional maturity. However, the best measure of emotional maturity is the degree of self-control which the individual has attained. The development of a high degree of self-control is closely related to the establishment of worthy ideals and values.

The emotions have been described in this chapter as learned responses to different emotional stimuli or emotional situations. They develop as a result of conditioning, imitation and other learning procedures. Important changes in emotional behavior occur with changes in age level. These changes in emotional behavior can best be accounted for through maturation and learning. The elementary-school child, while not completely discarding his early childhood fears of concrete situations and things about him, develops fears and worries relative to success in school. At a later stage when adolescence is reached his fears involve his relations with his peers. At this time differentiation in sex roles becomes more important, and the boy becomes concerned over his masculine self, while the girl is concerned over being a lady.

Any successful educational program must take into consideration the emotional characteristics of the child at different stages of his development. And, although wide differences in emotional responses appear there is a sequential order to be found here as elsewhere in the child's growth toward maturity.

Questions and Exercises

1. Look up several definitions of emotions. Give in your own words a definition of emotions.
2. Draw a diagram showing how the child may acquire fear of a dog through the conditioning process. What are the special features of such a diagram?
3. Compare the first- and sixth-grade child for the overt manifestation of fear and anger. What are some of the subtle ways the sixth-grade child uses for expressing his emotions?
4. Point out some misconceptions about how emotions are acquired. How would you account for the widespread acceptance of some of these viewpoints?
5. Show how imitation is important in the development of emotional behavior. Of what importance is this for the teacher of primary-grade children?

6. What are the educational implications of the methods suggested in this chapter for the elimination of undesirable emotional behavior? What is the responsibility of the schools in this connection?
7. Discuss the significance of the changes in emotional manifestations with age presented in this chapter.
8. What is meant by emotional maturity? Give some good evidences of emotional maturity in the growing child.
9. Observe some school-age child, preferably between six and nine years of age, for the manifestations of emotional behavior. What were some of the different emotions observed? Were any attempts made to conceal the emotions? What were the characteristics of the situations which provoked the emotions? To what extent would you say that the emotional expressions of the child were typical of children of his or her age-level?

Recommended Readings

Averill, Lawrence A., *The Psychology of the Elementary School Child* (New York: Longmans, Green and Company, 1949), Chap. II.

Breckenridge, Marian E., and Vincent, E. Lee, *Child Development,* 2nd ed. (Philadelphia: W. B. Saunders Co., 1949), Chap. III.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Company, 1952), Chap. VII.

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Jersild, Arthur T., *Child Psychology,* 3rd ed. (New York: Prentice-Hall, 1947), Chaps. VII and VIII.

Merry, F. K., and Merry, R. V., *The First Two Decades of Life* (New York: Harper and Bros., 1950), Chap. IX.

Millard, Cecil V., *Child Growth and Development in the Elementary School Years* (Boston: D. C. Heath and Company, 1951), Chap. XI.

Olson, Willard C., *Child Development* (Boston: D. C. Heath and Company, 1948), Chap. X.

Prescott, D. A., *Emotion and the Educative Process* (Washington: The American Council on Education, 1938).

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CHAPTER 5

The Nature and Measurement of Intelligence

PERHAPS THE most distinguishing difference between man and the lower animals is that trait called *intelligence*. Certainly it is closely correlated with the hierarchy of organic complexity in the animal world. The rat is more intelligent than the amoeba, the ape is more intelligent than the rat, and the human is the most intelligent of all. This chapter concerns the nature and measurement of intelligence on the human level.

THE MEANING OF INTELLIGENCE

Perhaps no term in psychology is so generally used with functional meaning and yet is so difficult to define with exactness as is the term *intelligence*. We all think we know what the word means; it means to be brilliant, to be smart, to be keen, to be superior; and yet, we merely push the mystery back a step because we do not know what these words mean either. Even the psychologists are not in agreement on the definition of intelligence. Some have defined it as the "ability to do abstract thinking," others as "good responses from the point of view of truth or fact," others as "insight into the meaning of things," and still others as the "ability to deal with future consequences." Pintner [1] classifies the definitions of intelligence as follows: (1) the biological ones, or those that consider intelligence to be the adaptation of an organism to its environment, (2) the mental faculty ones, or those that define intelligence as a mental capacity or aptitude,

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[1] Rudolph Pintner, *Intelligence Testing* (New York: Henry Holt and Co., 1931), p. 47.

(3) the educational ones, or those that define intelligence as the ability to learn new material, and (4) the empirical ones, which define intelligence in terms of the efficiency of reaction in a specific situation.

Intelligence certainly involves all these concepts and more. It is the ability to adjust to new situations; it is most certainly an aptitude which is inherited, at least in part; it includes the ability to learn; and its degree or amount affects the efficiency of behavior. It varies in degree from simple tropistic responses to complicated language behavior in the form of purposing, planning, prediction, and the like. At a later point in our discussion of intelligence the terms manifest intelligence and potential intelligence are used. Actually we know little about potential intelligence. It is the manifest intelligence arrived at through tests or some other evaluating device that are used in gathering information about the mental ability of children and adults. These tests will be described in detail later in this chapter.

Mental age. Another term widely used in educational circles to designate intelligence is *mental age*. This refers to the degree of intelligence equal to that of the typical child of a given chronological age. The typical child of eight, for example, has a mental age of eight; the typical child of ten has a mental age of ten; and the typical child of twelve has a mental age of twelve. Now, when a child of ten has mental ability equal only to that of a typical child of eight, he is said to be mentally inferior. Also, when a child of ten has mental ability equal to that of a typical child of twelve, he is said to be mentally superior. Mental age is a convenient way of designating the degree of intelligence.

Mental age can be determined, however, only by the use of some form of an intelligence test. When the score a child makes on an intelligence test is equal to that made by typical ten-year-old children, he is said to have a mental age of ten regardless of what his chronological age may be.

Factors composing intelligence. Thurstone has analyzed intelligence by a complicated statistical procedure, called factor analysis, and found that it is composed of relatively discrete factors which he called *primary mental abilities*.[2] These are as follows: *ability to calculate*, or ordinary mathematical ability; *verbal comprehension*, or a knowledge of the meaning of words; *verbal fluency*, or facility in the use of words; *space perception*, or the ability to visualize three dimentional space; *rote memory*, or the ability to memorize verbal material; *inductive reasoning*, or the ability to discover a principle or law from a series of data; and *perceptual speed*, or the ability to identify similarities and differences in groups of similar items, especially designs.

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[2] L. L. Thurstone, *Primary Mental Abilities* (Psychometric Monographs, 1938), No. 1.

These factors have been subjected to careful statistical analysis, with the result that some students have questioned their validity. Other authorities have named different factors; however most of them seem to agree that tests designed to measure intelligence should consist of different kinds of problems and exercises which would tend to measure different mental abilities.

THE MEASUREMENT OF INTELLIGENCE

It is a generally accepted axiom in science that progress in any field is dependent on the accuracy of the measuring devices in that field. Prior to the twentieth century few attempts had been made to measure intelligence. Since intelligence as an "inborn capacity" is largely an abstraction, any attempt to measure it must be based upon a functional definition. The materials dealing with intelligence presented in this and subsequent chapters are based upon scores made by individuals on certain intelligence tests.

Individual tests of intelligence. A test designed to measure intelligence was first developed in 1905 by two Frenchmen, Binet and Simon, for use with educationally retarded children. It was revised in 1908 and again in 1911. The first edition consisted of a series of simple but heterogeneous tasks of increasing difficulty. The normal child of three could complete the first nine items, the normal child of five could complete the first fourteen items, etc. The 1908 revision divided the tasks into age groups, extending from ages three to thirteen. The typical or normal child could complete all the items for his age group, but not for the next one above. If a ten-year-old could perform all the tasks in the twelve-year-old group, he was said to have a mental age of twelve years. Goddard translated this test into English in 1910, and developed American norms.

In 1916, Terman published the *Stanford Revision of the Binet-Simon Tests,* which was in general use until its revision in 1937. There are two forms of this revision (L and M) each of which contains 122 subtests and seven alternate tests. It extends from ages two to fourteen with four "adult levels." The test items for age nine are stated below to give a general idea of the nature of the entire test.

Age 9

1. Makes a drawing to indicate how a piece of folded paper in which a hole has been cut would look when unfolded.
2. Detects absurdities in verbal statements.

3. Reproduces designs from memory.
4. Gives a word which rhymes with certain other words.
5. Tells how much change would be left after certain transactions.
6. Repeats four digits reversed.

The Binet test and its revisions are given individually in interview. Only one subject is tested at a time. Careful training is necessary to administer the test in the prescribed manner so that children will be neither overrated nor underrated in mental ability.

In 1912 a German psychologist (Stern) suggested that if mental age, as determined by a test, were divided by chronological age the quotient would be relatively constant throughout the life of a child. For example, if a child of five has a mental age of six, the quotient obtained by dividing mental age by chronological age is 1.2 ($6 \div 5 = 1.2$). Then, if at the age of ten he has a mental age of twelve (this increase-ratio is found to be generally true), the quotient obtained by dividing mental age by chronological age is again 1.2 ($12 \div 10 = 1.2$). Stern called this the "intelligence quotient," or the IQ. For convenience the quotient was multiplied by 100 to eliminate the decimal. A normal IQ would thus always be 100 ($5 \div 5$, $8 \div 8$, $12 \div 12$, etc.). A mentally superior child would, of course, have an intelligence quotient of over 100 and a mentally inferior one would have an IQ under 100. An IQ then, is mental age divided by chronological age and the formula is $\mathrm{IQ} = \frac{\mathrm{MA}}{\mathrm{CA}} \times 100$.

Group tests of intelligence. During World War I, intelligence tests were developed which could be administered by one examiner to a large number of soldiers at one time. They were called group tests. The *Army Alpha* was for soldiers who could read and the *Army Beta* was for illiterates. More than a millon soldiers were given these tests.

During World War II, new intelligence tests were developed after the same pattern as the Army Alpha and the Army Beta of World War I. *The Army General Classification Test* (for literates), was administered to more than 10 million men and women. In general, it was composed of three types of test items: verbal comprehension, arithmetical reasoning, and space visualization or block counting.

Other prominent group intelligence tests are the *American Council on Education Psychological Examination,* the *Otis Self-Administering Tests of Mental Ability,* the *Ohio State Psychological Test,* the *California Mental Maturity Test,* etc. The *Wechsler-Bellevue Scale,* the *Detroit Learning Apti-*

tude Test, and the *Kuhlmann Mental Development Tests* are other individual tests which are administered by interview.[3]

An idea of typical content of intelligence tests may be obtained from the following examples:

WORD MEANINGS—*Underscore the synonym of the key word:*

Juvenile—awkward, youthful, dependent, bashful, versatile.

Famous—renewed, faithful, lazy, tiresome, renowned.

WORD FLUENCY—*Write two words that mean the opposite of the key word:*

narrow ________ ____________

large ________ ____________

CALCULATION—*Fill in the proper numbers:*

______ $\times$ 17 = 442

252 $\div$ ______ = 18

There are 1,872 tacks, nails, and screws mixed together in a box. If there are three times as many tacks as nails, and three times as many nails as screws, how many of each are in the box? ______

PERCEPTIAL SPEED—*Underscore the word on the right which fits with those on the left:*

horse, cow, kitten________mouse, dog, fox

hammer, shovel, saw________stone, tree, hoe

DEDUCTIVE REASONING—All Mongolians have slant eyes. John has slant eyes. Therefore, John is a Mongolian.

True________False.

INDUCTIVE REASONING—*Discover the rule and fill in the blanks:*

2 4 6 8____________12 14

10 8 11____________12 10 13

Intelligence is also measured in other ways. For example, Goodenough[4] standardized the drawing of a man so that it was possible to determine the intelligence of a child by merely asking him to draw a man. Figure 5-1 shows four drawings and their mental age equivalents. Other tests determine intelligence by filling in deleted parts of pictures, others by fitting parts of pictures together, not unlike the common jig saw puzzles, and still others by tracing through printed mazes of increasingly complex structure.

Test norms. A discussion of the measurements of intelligence would not be complete without mention of norms or standards. No measurement has meaning unless it is compared with norms. For example, 20 miles is much or little depending on the standard with which it is compared. If it is the distance a man walks in three hours, it is much; but if it is the distance he walks in 10 hours, it is little. Three hundred pounds is much if we are talking of the weight of a man, but it is little if we are talking of a horse. Likewise a score of 125 on a test may be high or low depending on whose scores it is compared with. Norms are essential to the interpretation of any form of measurement. Some tests are not useful because they do not have adequate norms, and others are not useful because they do not have appropriate norms.

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[3] An excellent list of psychological tests may be found in the appendix of *Measurement of Human Behavior* by E. B. Greene (New York: The Odyssey Press, 1952).

[4] F. L. Goodenough, *Measurement of Intelligence by Drawings* (Yonkers-on-Hudson: World Book Co., 1926).

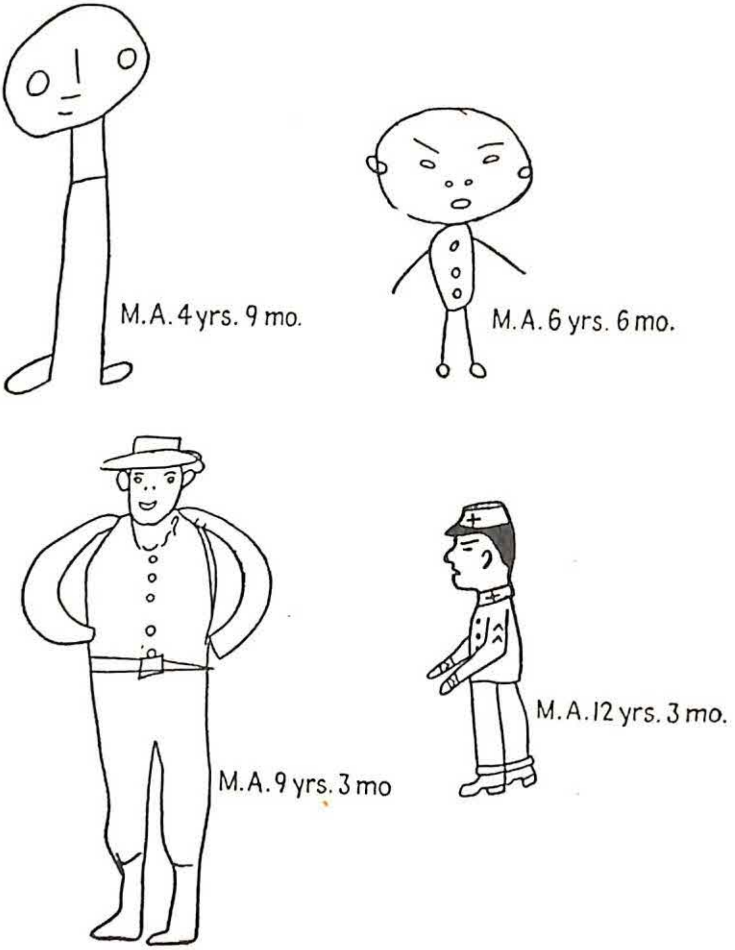
M.A. 4 yrs. 9 mo.
M.A. 6 yrs. 6 mo.
M.A. 12 yrs. 3 mo.
M.A. 9 yrs. 3 mo

FIGURE 5-1. Drawings-of-a-man and their mental age equivalents

Test norms are usually expressed as distributions of the scores made by other people. For example, the Z scores of 400 college students on an apparatus for measuring hand precision were distributed as shown in Figure 5-2. Now suppose that John Jones makes a score of 130 on this test. It can be seen that he is well above the average. Reference to a "percentile table" that accompanies the test indicates that John is at the 88 percentile, or equal to or better than 88 per cent of all those college students who have taken the test. But suppose that John is not a college student. The college norms would not be an appropriate group with which to compare him. If he is a skilled mechanic and we compare him with norms for this group, he is then not nearly as superior. His score places him in the 78 percentile, or equal to or better than 78 per cent of all mechanics who have taken the test.

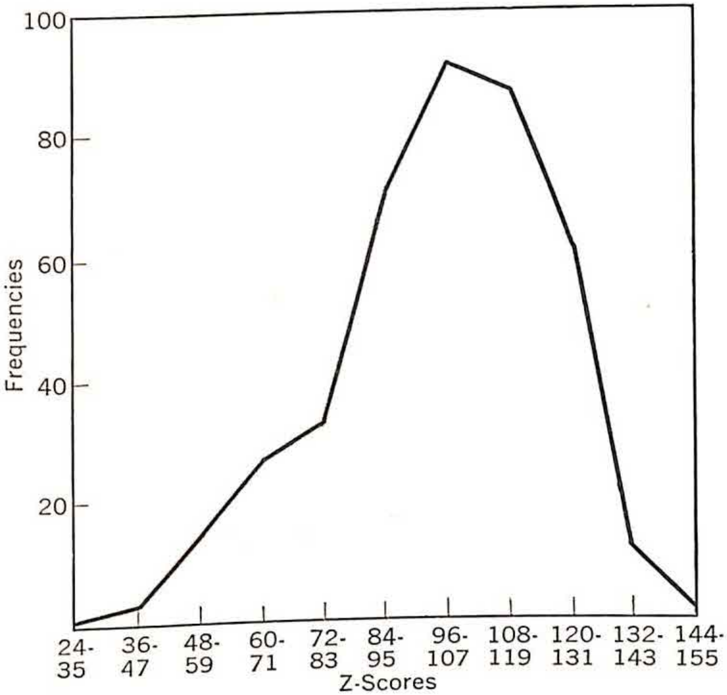

FIGURE 5-2. The distribution of the scores of 400 college students on a hand-precision test

Now suppose that we had no norms at all for this test. We could not tell whether the score that John made was high, low, or average. Norms are absolutely essential in interpreting scores made on any test. (The statistical procedures necessary in the development of norms are briefly described in the appendix of this book.)

In summary, intelligence is measured by sampling certain phases of it and then comparing the results with norms, or the results obtained when the same set of samples are given to others. Both the test and the norms should be appropriate for the individuals being measured. Intelligence tests designed for college students are not likely to be very useful in the typical grade-school situation. Likewise, the norms obtained from measuring college students are of little value in interpreting the scores of grade-school students.

THE RESULTS OF MEASURING INTELLIGENCE

As is true in the field of science little is discovered until adequate methods of measurement are developed. The intelligence test was a prerequisite to any significant research in this field. The following pages review some results obtained from the use of intelligence tests.

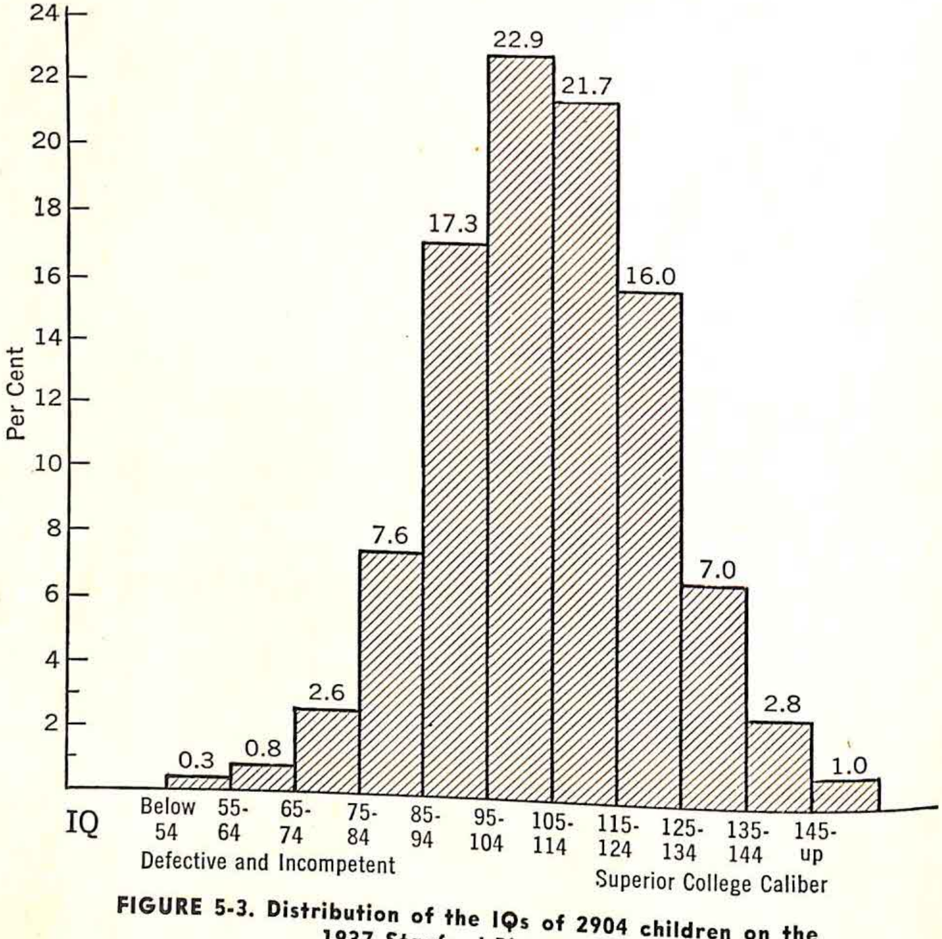

FIGURE 5-3. Distribution of the IQs of 2904 children on the 1937 *Stanford-Binet Test*

Distribution of intelligence test scores. Intelligence, like other factors in nature, is distributed in "a normal manner," that is, there are a few people who are very superior, a large number who are a little superior, a great majority who are average, a goodly number who are inferior, and a few who are very inferior. A typical normal curve of distribution of intelligence test scores is shown in Figure 5-3.[5] This is the distribution of the IQ's of 2904 children on the 1937 Stanford-Binet test. Note that the distribution above the average is quite like that below. It is said to be symmetrical. When the scores made on a test by a group of individuals are not symmetrical above and below the average, it is an indication that the group is not typical of the general population. For example, when the scores, on the Army Alpha Intelligence test, of 2773 soldiers with only a fourth-grade education are plotted on the same graph with those of 3954 officers who were college graduates, there was a double variation from the normal curve. (These data are shown in Figure 5-4.) Even without explanation it is obvious from the distribution that the scores were made by a superior group and by an

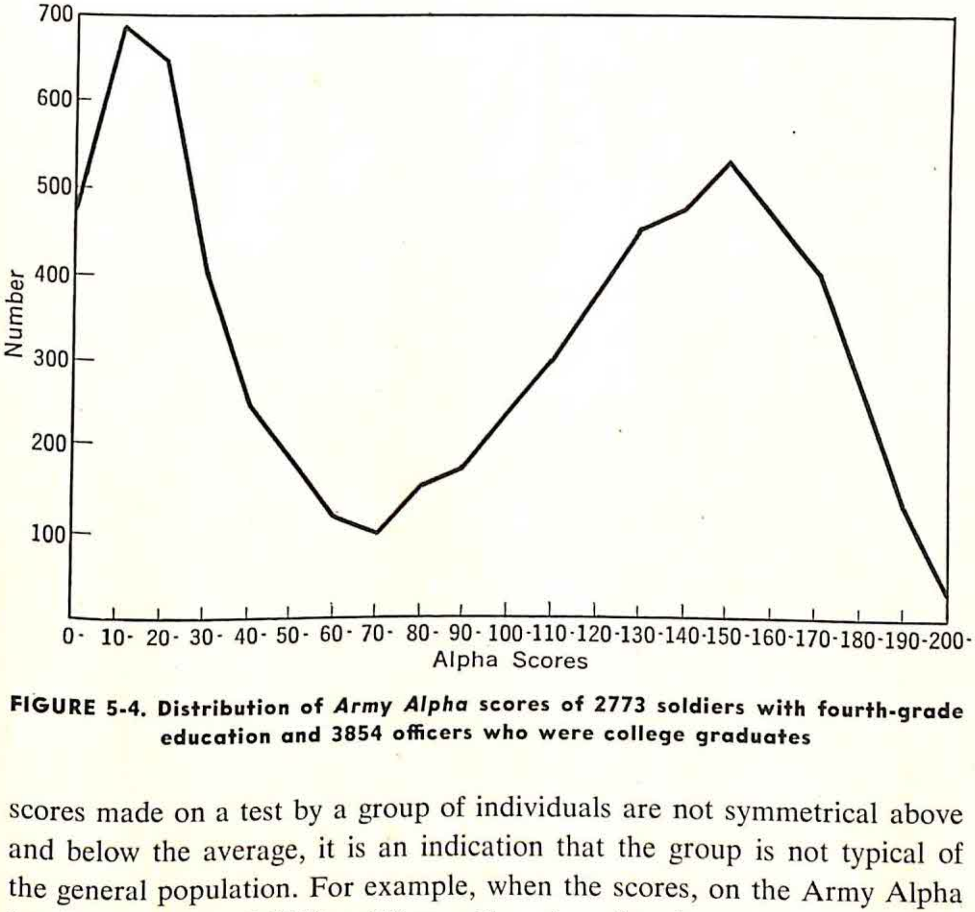

FIGURE 5-4. Distribution of *Army Alpha* scores of 2773 soldiers with fourth-grade education and 3854 officers who were college graduates

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[5] Modified from Q. McNemar, *Revision of the Stanford-Binet Scale* (Boston: Houghton Mifflin Co., 1942).

inferior group. They could not have been made by a typical group or the distribution would have been more like those of Figures 5-3 and 5-4.

Levels of intelligence. Those individuals who make very low scores on intelligence tests are called "feeble-minded," and those who make very high scores are called "geniuses." The feeble-minded group is further classified on three levels—moron, imbecile, and idiot. Morons can reach the fourth grade in school and perform simple work that requires no judgment or insight. The mental age of adult morons falls within the range of 8 to 11 years. Imbeciles are able to take care of their vegetative needs and can talk, but they are unable to make a living. The mental age of adult imbeciles ranges from 4 to 7 years. Idiots are those who at maturity are unable to care for their own personal needs and have a mental age of 3 or less. They are usually institutional patients.

GROWTH OF INTELLIGENCE

There are some who would make a distinction between intelligence as that which is inherited and intelligence as that which is measured by intelligence tests. However, the only data available about the growth of intelligence are those obtained from administering intelligence tests to the same individual repeatedly for a number of years. A study of the nature of intelligence tests shows that they consist of varied types of problems and exercises, which furnish a measure of general scholastic aptitudes. These tests have recently been referred to as scholastic aptitude tests.[6] A careful study of the results of repeated tests on the same subjects have furnished some useful data about the growth of intelligence or scholastic aptitude.

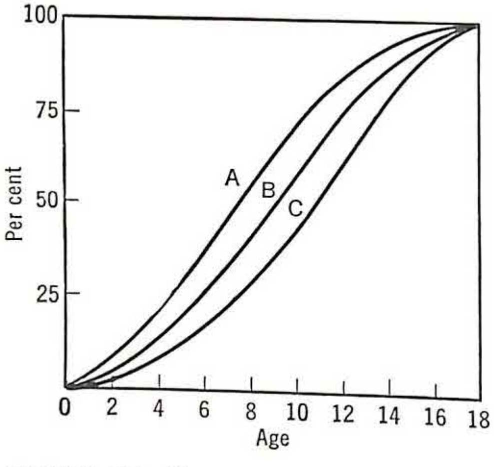

FIGURE 5-5. Three possible patterns of maturation of normal children

Patterns of development. Because a child develops slowly, it must not be concluded that he is mentally inferior. Neither should it be assumed that if he develops rapidly he is mentally superior. A superior child may be slow in getting started and a dullard may make an impressive beginning. Figure 5-5 illustrates three patterns of mental development of *normal* children. A child who develops like pattern A is likely to be considered precocious until he is 15 or 16. One who develops like pattern C is likely to be considered dull until midadolescence. At the age of 8, A has undergone 50 per cent of his maturity while C has undergone but 25 per cent of his maturity. Children of the same chronological age may not be of nearly the same maturational age.

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[6] See Lee J. Cronbach, *Educational Psychology* (New York: Harcourt, Brace and Co., 1954), pp. 187-188.

It is true, however, that superior children do mature more frequently like pattern A (in Figure 5-5) and inferior children more frequently like pattern C. The mental development of superior, average, and backward children is shown in Figure 5-6. Note that differences become greater with increased chronological age. The backward child is more inferior to the average as he gets older and the superior child is more superior.

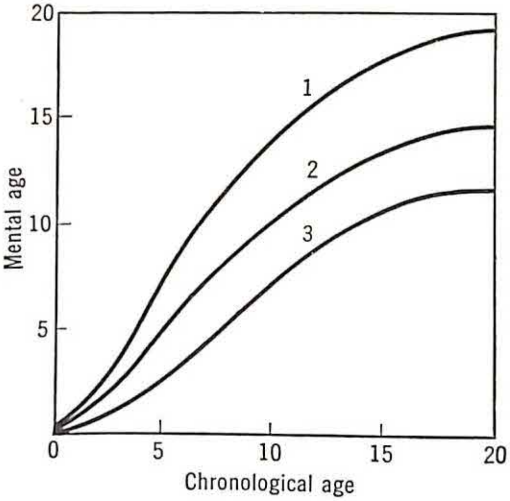

FIGURE 5-6. The mental development of (1) superior, (2) average, and (3) dull children

Stability of intelligence test scores. The problem of the stability of mental test scores is of utmost importance. This problem has been given considerable attention by educational psychologists, beginning with the momentous work of Binet with retarded children of the schools of Paris. This issue has been referred to as "the constancy of the IQ." It makes a great deal of difference when planning the educational program for a child whether or not the IQ can be raised. If through special coaching the IQ can be raised the mentally handicapped child may ultimately be expected to do satisfactory school work. Otherwise, an educational program must be planned for the child's level of intelligence as judged by the intelligence test scores.

An answer to the question of the stability of the IQ must first of all take into consideration certain definitions and facts about intelligence and intelligence tests. In the first place we must differentiate between intelligence as an "inborn capacity," and intelligence as measured by intelligence tests. Certainly we cannot hope to improve on inherited ability. Furthermore, it has already been suggested that it is not possible to measure intelligence as an "inborn capacity." An individual's score on an intelligence test is a measure of how many of the test exercises and problems he performed correctly. How many of these he performs correctly will be determined by a combination of a number of factors, including hereditary characteristics, opportunity for learning, physical and mental conditions, and motivation.

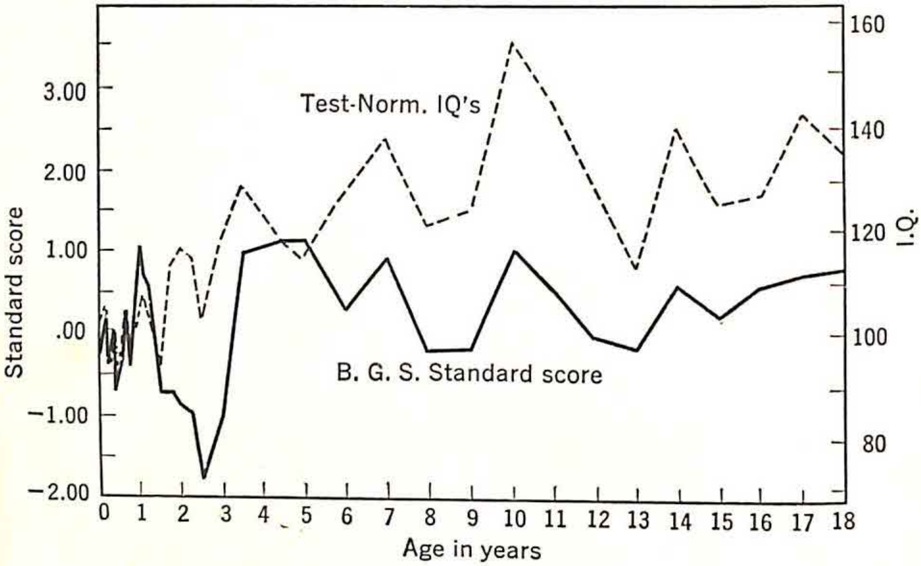

FIGURE 5-7. Standard score and IQ curves for Case 3 M

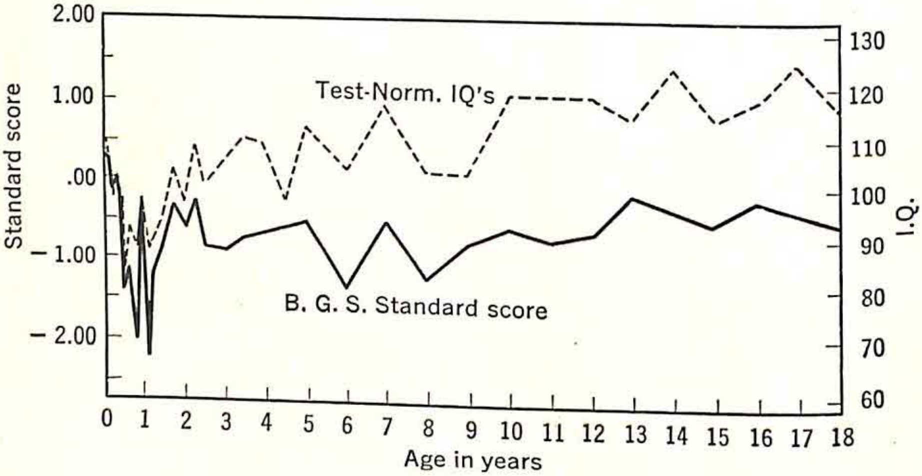

FIGURE 5-8. Standard score and IQ curves for Case 15 F

Long-term growth curves, collected on 48 children by Nancy Bayley, show that the growth of intelligence is far from constant.[7] An examination of the individual growth curves shows that only a fifth of the children had maintained approximately the same relative position throughout the first

[7] Nancy Bayley, "Consistency and Variability in the Growth of Intelligence from Birth to Eighteen Years," *Journal of Genetic Psychology*, Vol. 75 (1949), pp. 165-196.

nine years. Some had successive periods of rapid and slow growth, while others showed a fairly consistent trend in fast or rapid growth over a longer period of time. Examples of individual trends for a boy and a girl are shown in Figures 5-7 and 5-8. The growth curves are plotted in terms of standard scores (sigma scores) and IQ's. The IQ's were derived from published norms for the tests used. The standard scores were computed from the means of the mental ages for the group. The IQ curve for Case 3M swings back and forth, going as low as 70 on the test at age two and a half, and as high as 120 on at least one occasion. The pattern of growth for Case 15F is somewhat more steady, hovering around 85 to 90 from age three to twelve, but rising above 90 after age twelve.

Age and intelligence. The relation of age to intelligence on the lower levels has already been discussed. Too little is yet known about the maintenance of intelligence throughout life. It is more difficult to get people past fifty to take intelligence tests than it is children in the public schools. Miles gave the 15-minute form of the Otis test to 820 people ranging from adolescence to old age.[8] Figure 5-9 shows a distribution of the scores. Note that the peak is between the ages of 20 and 30, after which there is a slow decline. However, the test score of the average person of 55 is still equal to that of the average 15-year-old. This graph can be misleading unless it is carefully observed, that it represents the average of a very small sample of people in two small cities (12,000 and 15,000 population), and that at every age level half the group tested were higher on the test than shown on the graph and half were lower.

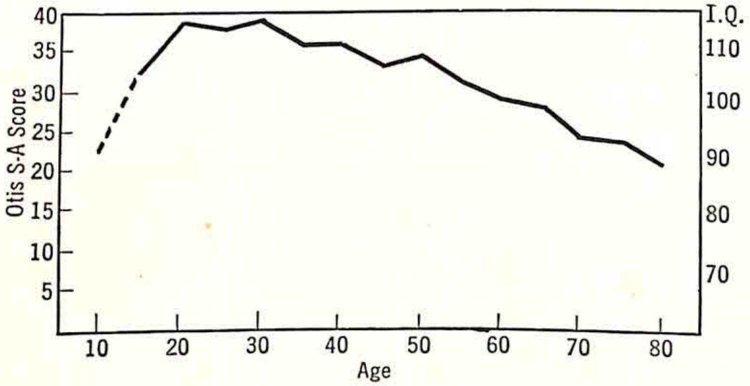

FIGURE 5-9. Average intelligence level for various ages throughout life

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[8] C. C. Miles and W. R. Miles, "The Correlation of Intelligence Scores and Chronological Age from Early to Late Maturity," *American Journal of Psychology*, Vol. 44 (1932), pp. 44-48.

A number of studies reveal that the speed factor is important in connection with scores made by different age groups on intelligence tests. In one study a battery of intelligence tests was administered to 143 subjects ranging in age from twenty to seventy years.[9] The scores of the three age groups on the three tests of intelligence are given in Table 5-1. The average scores of the three age groups were about the same on the CADV test, which is a power vocabulary test. The average scores show a decrease with age on the other tests of intelligence, which tend to combine power and speed. This indicates that testing should be adapted to the maturity level of the subjects being tested. Wechsler found that some of the subtests of the *Wechsler-Bellevue Scale* registered a smaller decline than did others.[10] From a study of the results of the eleven subtests of the scale, he was able to determine those tests which were constant for the different age groups and those which were not constant. The following categories are presented

TABLE 5-1. *Means for a battery of tests of intelligence by three age groups equated on the basis of altitude scores on the CAVD Scale*

AGE RANGE	CAVD	ARMY ALPHA	OTIS S. A. TESTS (20 MINUTES)
20.0-25	405.25	149.61	44.39
27.5-37.5	405.66	142.26	39.26
Over 40.0	405.51	132.43	33.39

Tests which are constant with age

- Information
- Comprehension
- Object assembly
- Picture comprehension
- Vocabulary

Tests which are not constant with age

- Digit span
- Arithmetic
- Digit symbol
- Block design
- Similarities

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[9] Irving Lorge, "The Influence of the Test upon the Nature of the Mental Decline as a Function of Age," *Journal of Educational Psychology*, Vol. 27 (1936), pp. 100-110.

[10] David Wechsler, *The Measurement of Adult Intelligence* (Baltimore: The Williams and Wilkins Company, 1944), p. 64.

THE NATURE-NURTURE CONTROVERSY

The relative influence of "nature and nurture" on intelligence has long been a mooted question. Galton's report (1869) that genius runs in families, and Goddard's report (1914) that the same is true of feeble-mindedness, do not prove that heredity is even the major factor. Both geniuses and morons grow up in the environment of their parents. The Kallikaks studied by Goddard were reared in the restricted environment of feeble-minded Kallikak parents. Both heredity and environment were inferior and low intelligence could be expected. However, any attempt to set one off against the other is not only futile but based upon a faulty conception of growth and development. It was pointed out in Chapter 2 that heredity and environment operate jointly from the very beginning of life. Thus, it is impossible to determine the exact influence of either.

In his 1947 report of the intelligence of the children of the "gifted" group first studied in 1922, Terman reports that 7.3 per cent of the children have IQ's below 100 and 15.4 per cent have IQ's above 150.[11] The average IQ of the children was 128 (whereas that of their parents was 155). Certainly this indicates that heredity is a powerful factor in determining intelligence, even though children were also reared in the superior environment created by their gifted parents. Their superiority was the result of the interaction of their superior heredity and environment on their development.

Identical twins reared apart. Identical twins have the same heredity. When reared together they will likely have about the same environment. Newman approached the problem of the influence of environment by studying identical twins reared apart.[12] The intelligence test scores of these were

TABLE 5-2. *Correlation between traits of identical twins reared together and identical twins reared apart*

	REARED TOGETHER	REARED APART
Height	.98	.97
Weight	.97	.89
Head Length	.91	.92
Binet IQ	.91	.67
Educational Age	.96	.51
Personality	.56	.58

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[11] See L. M. Terman and M. H. Oden, *The Gifted Child Grows Up* (Palo Alto: Stanford University Press, 1948).

[12] Reprinted from *Twins: A Study of Heredity and Environment*, by H. H. Newman, F. N. Freeman, and K. J. Holzinger by permission of The University of Chicago Press. (Copyright, 1937, by The University of Chicago Press.)

compared. He found that those twins reared together were much more alike in intelligence than those reared separately—indicating that environment is a factor in determining a child's intelligence test score. Height and weight are apparently little affected by environment, as shown in Table 5-2. On the other hand the IQ correlated with educational environment .79 and with the social environment .53.

Children in foster homes. The hereditary phase of intelligence is apparently no different from the heredity of any other cluster of related traits. Intelligence runs in families and occasionally one factor may occur in high degree while other factors are in low degree. This is indicated by Burks [13] who compared foster children with real children in relation to the intelligence of parents. The intelligence of foster children is no more related to the intelligence of foster parents than would be expected from the influence of environment. On the other hand, the relation of the intelligence of real children to that of their parents is comparatively high. Burks' data are shown in Table 5-3.

TABLE 5-3. *The correlation of the intelligence of foster and real children to that of their parents*

Burks Data	FOSTER CHILD	REAL CHILD
Father's Mental Age	.09	.55
Mother's Mental Age	.23	.57
Father's Vocabulary	.14	.52
Mother's Vocabulary	.25	.48
Cultural Index of Home	.29	.48
Leahy Data		
Parents' Intelligence	.18	.60
Parents' Vocabulary	.34	.56

Another study by Leahy [14] found essentially this same relationship. These data clearly indicate that both heredity and environment affect intelligence. Were there no environmental influence the correlations between foster parents and children would be zero. In fact the correlation between the intelligence of adults and children who are unrelated and living in different homes has been found to be zero. Obviously then, the small but positive correlations between foster children and foster parents is due to environment. Consequently we can infer that part of the larger correlation between

[13] B. Burks, "The Relative Influence of Nature and Nurture on Mental Development," *Twenty-seventh Yearbook of the National Society for the Study of Education* (Chicago: Univ. of Chicago, 1928), Part I, pp. 219-346. Quoted by permission of the Society.

[14] A. M. Leahy, "Nature-nurture and Intelligence," *Genetic Psychology Monographs,* Vol. 17 (1933), pp. 236-308.

parents and real children is also due to environment. The question is—How much?

Somewhat different results have been reported from investigations conducted at the University of Iowa. In one study 87 children of mothers who were mentally retarded were studied after they had been placed in foster homes.[15] The mental test scores of these children equaled of exceeded that of average children. Before one can draw conclusions from studies of this nature further information must be secured about the (1) exact mental status of the mothers, (2) the mental ability of the fathers, and (3) any selective factors that might have operated in connection with the placement of these children. Another noteworthy study was made with a group of illegitimate children, whose mothers had an average IQ of 88, as subjects.[16] Soon after birth the children were placed in foster homes. At the average age of four years and four months their mean IQ was 112. Skodak interprets this to mean that inferior heredity may be partly compensated for by normal and superior environment.[17] An interesting finding, somewhat at variance with Skodak's conclusions, is that after a period of several years correlations of .16 to .19 were obtained between the intelligence of the children and the educational level of their foster parents. These are about the same as the coefficients reported by Burks and Leahy, which were accounted for in part through selection.

Effects of a restricted environment. A unique study of the influence of an adverse environment upon the growth of intelligence was reported by Gordon, with a group of canal-boat children and a group of gypsy children as subjects.[18] These children lead a very limited life, being cut off from social contact most of the time, except with their own family group. The average IQ of the canal-boat children was found to be 69.6, which is near the borderline of children classed as mentally defective. An interesting feature of this study was the decline in IQ with increase in age. The age-group from 4 to 6 had an average IQ of approximately 90, while the average IQ for the age-group from 12 to 22 was approximately 60. Certainly these results reveal the importance of a favorable environment for the development of those abilities measured by intelligence tests.

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[15] H. M. Skeels, "Children with Inferior Social Histories: Their Mental Development in Foster Homes," *Psychological Bulletin,* Vol. 38 (1941), p. 594.

[16] M. Skodak, *Children in Foster Homes* (University of Iowa Studies in Child Welfare, 1939), No. 15.

[17] There has been much controversey over the results of the Iowa studies, which tended to emphasize the importance of environment. For a severe criticism of these studies the advanced student is referred to Q. McNemar, "A Critical Examination of the University of Iowa Studies of Environmental Influences upon the IQ," *Psychological Bulletin,* Vol. 37 (1940), pp. 63-92. For a reply see B. L. Wellman, H. M. Skeels, and M. Skodak, "Review of McNemar's critical Examination of Iowa Studies," *Psychological Bulletin,* Vol. 37 (1940), pp. 93-111.

[18] Hugh Gordon, "Mental and Scholastic Tests among Retarded Children," *Education Pamphlet,* No. 44 (London: Board of Education, 1923).

Studies of the intelligence test scores of children in restricted mountain communities, which constitute poor environment for mental development, show a similar progressive reduction in IQ. Figure 5-10 shows the IQ of mountain children for ages 6 to 16.[19] If the environment had been average or normal, the IQ would have remained fairly stable at the different age levels. A restricted environment handicaps children so that mental development does not keep up to the test norms. The mental age of children at six was not far below normal; but at the age of 16, the Kentucky children had a mental age of less than 10, and the Tennessee children were only about 2 years higher. Both were definitely inferior to national norms.

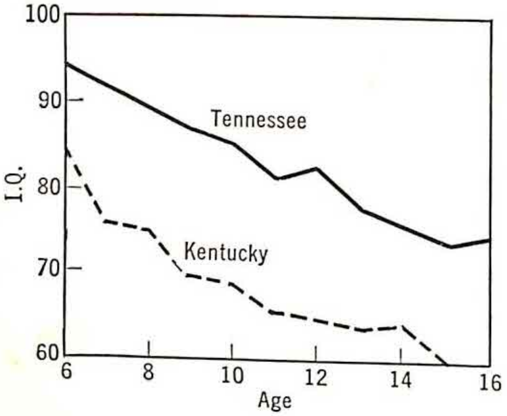

FIGURE 5-10. The IQ of isolated mountain children at various ages

Closely related to these studies is a study by Speer of the mental development of children of feeble-minded mothers.[20] He noted that the longer a child remains in a given environment the more his IQ assumes the level characteristic of the environment. The longer children of feeble-minded mothers remain with their mothers the lower the IQ of the children becomes. Table 5-4 shows this relationship.

TABLE 5-4 *The effects of feeble-minded mothers on the intelligence of their children after birth*

AGE OF CHILD	N	MEDIAN IQ
-2	12	100.5
3-5	19	83.7
6-8	12	74.6
9-11	9	71.5
12-15	16	53.1

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[19] L. R. Wheeler, "The Intelligence of East Tennessee Mountain Children," *Journal of Educational Psychology*, Vol. 23 (1932), pp. 351-370.

[20] G. S. Speer, "The Mental Development of the Children of Feeble-minded and Normal Mothers," *Thirty-ninth Yearbook of the National Society for the Study of Education* (Chicago: Univ. of Chicago, 1940), Part II. Quoted by permission of the Society.

THE USEFULNESS OF INTELLIGENCE TESTS

Intelligence tests have been found useful in a variety of ways. However, it should be realized that they have definite limitations. An interpretation of a child's test score should take into account his cultural background, educational opportunities, health, and dynamics. Some of the major uses of intelligence tests in educational situations will be presented for special study.

Intelligence test scores and school achievement. In the traditional school curriculum with its emphasis upon reading, writing, and verbal tests a child with low intelligence test scores was not likely to do successful school work. When one considers the nature of intelligence tests and traditional verbal achievement tests, it appears quite natural that a significant relationship should exist between achievement and intelligence. In one study bearing on this problem 1608 pupils were first tested in the sixth grade.[21] These pupils were then traced for 15 years. The results, presented in Table 5-5, show that at each educational level studied the IQ's of those remaining in school were progressively higher than at the preceding level. In such school situations the great majority of pupils with an IQ of 90 or less will drop out as soon as they reach the compulsory school-age limit. Studies show, however, that the modern school program is holding more pupils in school.

Correlations between intelligence test scores and academic grades vary with a number of factors but usually range between .30 and .75. Bradley found that correlations between intelligence and teacher's marks for 1,500 junior and senior high school pupils in Philadelphia ranged from .33 to .64.[22] Expressed in another way, this relation was even more impressive. The ratio of the per cent of A grades to the per cent of pupils with IQ's

TABLE 5-5. *Students with high IQ's tend to remain in school longer*

	PER CENT OF GROUP STILL IN SCHOOL	MEDIAN IQ OF THOSE STILL IN SCHOOL	MEDIAN IQ OF THOSE WHO HAVE LEFT SCHOOL
In sixth grade (original group)	100	108	
Entering high school	84	111	95
Graduating from high school	49	115	102
Entering college	18	119	106
Graduating from college	8	123	107

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[21] Viola E. Binson, "The Intelligence and Later Scholastic Success of Sixth-Grade Pupils," *School and Society*, Vol. 55 (1942), pp. 163-167.

[22] W. A. Bradley, "Correlates of Vocational Preferences," *Genetic Psychology Monographs*, Vol. 28 (1943), pp. 99-169.

above 140 was 16 to 1, whereas this ratio for those whose IQ fell between 90 and 110 (the average) was but 0.4 to 1. These data are shown in Table 5-6.

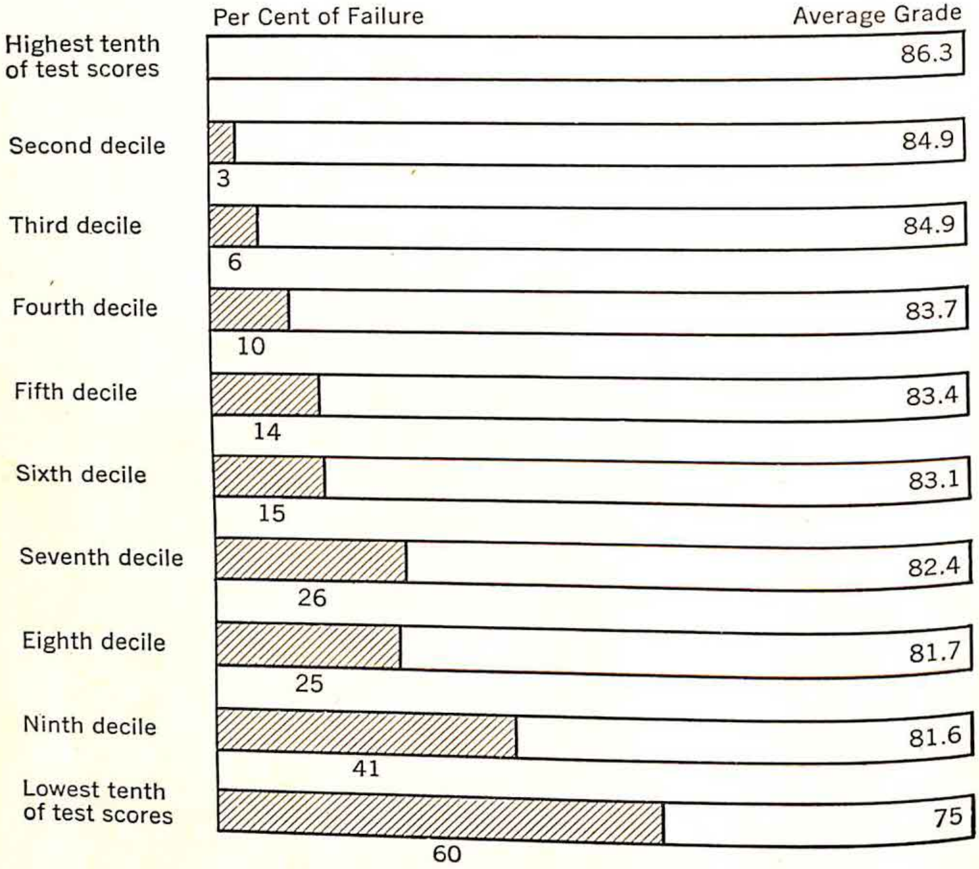

FIGURE 5-11. Relation between medical school entrance test scores and grades made in medical school

From these data it would appear that pupils should have IQs above 110 to do satisfactory high school work in Philadelphia. Kefauver[23] found that the average high-school pupil's IQ depends on what course in high school is being considered. The average IQ of trades high-school students is definitely lower than for those taking the college preparatory course. The median IQ for college preparatory students was 114, for regular academic students 106, for commercial students 104, and for those taking the trade course 92.

The relation of intelligence to academic success has been studied care-

[23] G. N. Kefauver, *et al, The Horizontal Organization of Secondary Education,* U. S. Office of Education Bulletin No. 17 (1932).

TABLE 5-6. *Relation of mental ability to high and low grades in high school*

IQ	PER CENT OF PUPILS	PER CENT OF A'S	RATIO OF PER CENT OF AS TO PER CENT OF PUPILS	PER CENT OF D'S	RATIO OF PER CENT OF D'S TO PER CENT OF PUPILS
140-149	0.2	3.2	16.0	0	0
130-139	1.3	10.6	8.1	0	0
120-129	7.5	25.5	3.4	0	0
110-110	22.5	35.1	1.6	0	0
100-109	32.5	18.1	0.6	13.7	0.5
90-99	25.3	4.3	0.2	36.8	1.5
80-98	9.7	3.2	0.3	42.3	4.3
70-79	1.0	0.0	0.0	5.3	5.3

fully by the American Medical Association and reported by Moss.[24] There is a very close relation between scores made on the *Medical Schools Admission Tests* and the grades students make in medical schools. These results are shown in Figure 5-11.

The significance of intelligence in the training of pilots during World War II is vividly illustrated in Figure 5-12. A soldier's ability rank was determined by a battery of tests all of which could not be classed as measuring intelligence. However, intelligence was the major factor in these selection tests. The per cent given in Figure 5-12 is of the number at each ability level which succeeded in becoming pilots.

Johnston[25] found that when he combined the percentile value of high school mathematics grades with the score made on an intelligence test (he

TABLE 5-7. *The relation of college success to combined high school mathematics grades and intelligence test scores*

COLLEGE APTITUDE RATING	N TOTAL	N SUCCESSFUL IN COLLEGE	PER CENT SUCCESSFUL IN COLLEGE
91-100	213	201	94.4
76-90	428	308	71.9
51-75	692	284	41.0
26-50	613	92	15.0
11-25	208	3	1.4
1-10	58	0	0.0

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[24] F. A. Moss, "Report of the Committee on Aptitude Tests for Medical Schools," *Journal of the Association of American Medical Colleges*, 1936.

[25] J. B. Johnston, *Who Should Go to College?* (Minneapolis: University of Minnesota Press, 1930).

called this the CAR or "College Aptitude Rating") he could predict college success with fair accuracy. More than 90 per cent of those on the upper CAR levels were satisfactory college students, whereas less than 10 per cent of those on the lower levels were satisfactory. Johnston's data are shown in Table 5-7.

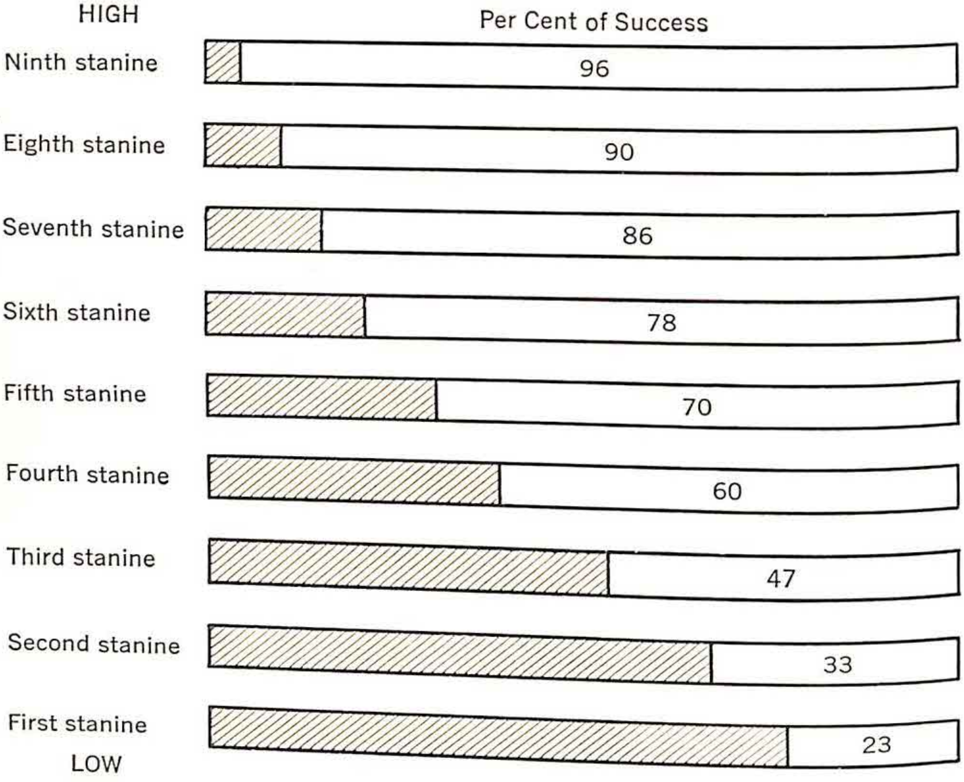

FIGURE 5-12. Relation of selection test scores to success in pilot training

Robinson[26] reports a study by Toops and Bittner which shows that the academic success of college graduates is closely related to their intelligence test scores. More than one-third of the graduates of Ohio State University during a ten-year period were in the top 20 per cent on an intelligence test taken in their freshman year. Only one-fifteenth were in the bottom 20 per cent. These data are shown in Table 5-8.

Intelligence test scores and vocational adjustment. Intelligence tests are widely used today in guidance programs at school and in connection with personnel work in industry. The relation of the amount of intelligence to the degree of success in occupations varies with occupations. Success on jobs

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[26] F. P. Robinson, *Effective Study* (New York: Harper and Bros., 1946), p. 158.

TABLE 5-8. *Per cent of college graduates (over a ten-year period) in each quintile on an intelligence test*

LEVEL ON IQ TEST	BACHELOR DEGREE IN — ARTS	EDUC.	ENGIN.	LAW	TOTAL AVE.
Top quintile	39	31	32	41	36
4th quintile	25	25	24	23	24
3rd quintile	17	21	21	15	19
2nd quintile	12	17	13	14	14
Bottom quintile	7	6	10	7	7

that require but little intelligence is not related to the degree of intelligence except in labor turnover. Workmen are more likely to quit jobs that do not require as much intelligence as they have available, than they are to quit jobs that more nearly fit their intelligence level. Figure 5-13 shows the relation of scores on a mental alertness test and job turnover for women clerks. This old study was reported by Scott.[27] Those without enough intelligence quit because the job was too difficult and those with too much intelligence quit because the job was uninteresting.

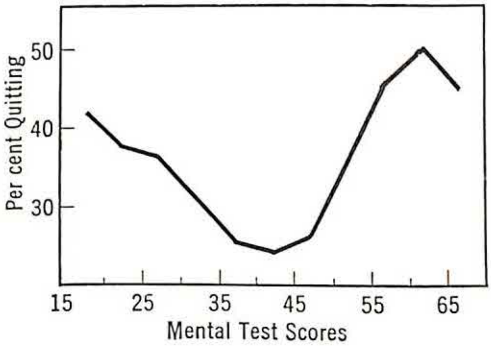

FIGURE 5-13. Relation between intelligence and job turnover

The importance of intelligence (as indicated by college grades) is shown in a report by Magoun in which students with high grades in college have a better chance of being included in directories of distinction than do those with low grades.[28] When we consider the general nature of intelligence, it becomes obvious that a high degree of intelligence is essential for reasoning and problem solving of a complex nature. The importance of the highest educational development of those with superior intelligence is recognized today as never before. However, it should be pointed out that the vast majority of jobs do not require more than average intelligence. The chapters bearing on personality development and adjustment will emphasize the fact that good personal and social adjustment is largely dependent upon factors other than the possession of a high degree of intelligence.

[27] W. D. Scott, "Turnover and Mental Alertness Test Scores," quoted by Poffenberger in *Principle of Applied Psychology* (New York: Appleton-Century-Crofts, Inc., 1942), p. 300.

[28] F. A. Magoun, *Scholarship and Distinction* (Massachusetts Institute of Technology Bulletin, 1935), Vol. 37, No. 8.

SUMMARY

In this chapter, intelligence was given a broad definition—one which would include all phases of mental ability. Intelligence tests have been developed in an attempt to measure various phases of this ability. A distinction was made between intelligence as an "inborn capacity" and intelligence as measured by intelligence tests. The score one makes on an intelligence test merely shows the relation of the individual being measured to other individuals on the traits or abilities measured by the test. Some tests measure but one factor of intelligence and other tests measure several factors. All intelligence test are tools which have been used to discover interesting and useful things about intelligence.

1. It has been found that intelligence is distributed in the general population in a normal manner. A few are very intelligent, a few are very unintelligent (feeble-minded), and a great many range between these extremes.
2. With intelligence tests it has been possible to measure and compare the intelligence of different groups of people. Occupational groups differ in intelligence; social groups differ in intelligence; and, of course, educational groups differ. On the other hand, it has been found that racial groups probably do not differ in intelligence, and certainly sex groups do not differ. Group differences in intelligence are believed to be largely due to cultural differences and to selection of those who are tested.
3. With the use of intelligence tests it has been possible to study the development of intelligence and the factors that affect this development. Heredity and environment do not act separately in their effects upon the development of intelligence. Thus, it is impossible to state their relative contribution to the development of one's mental capacities.
4. Intelligence test scores have been found useful in educational and vocational guidance; although this is only one of a number of factors which determines one's educational and vocational achievement.

Questions and Exercises

1. In your own words, write out exact definitions of—intelligence, mental age, IQ, and primary mental abilities.
2. Distinguish between individual and group tests of intelligence. Give advantages and disadvantages of each.
3. How do normal children differ in mental maturation?
4. In which of the following types of work is a high degree of intelligence probably useful or essential: Driving an automobile? Learning to type?

Elementary-school teaching? Selling insurance? Writing essays? Composing a hymn? Sawing wood? Preparing well-balanced meals? Repairing a clock?

5. Consider the discussion presented in this chapter dealing with the meaning of intelligence. Do you consider the definition or description a rigid or elastic one? What, then, seems to be the core of intelligence?
6. How would you account for the decline in IQ of children reared in an impoverished environment? What is the significance of this for teachers of such children?
7. Study the content and vocabulary of some group test of intelligence. What words and exercises do you note that may be unfair to underprivileged children? To certain minority groups?
8. Study the intelligence test scores of some group of children. What is the range of these scores? What is the average score? Compare the distribution of these scores with the normal distribution curve.

Recommended Readings

Anastasi, A. and Foley, J. P., *Differential Psychology* (New York: Macmillan Co., 1949).

Cronbach, L. J., *Essentials of Psychological Testing* (New York: Harper and Bros., 1949).

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: Macmillan Co., 1948), Chap. VII.

Greene, E. B., *Measurements of Human Behavior* (New York: Odyssey Press, 1952).

Mursell, J. L., *Psychological Testing* (New York: Longmans, Green and Co., 1947).

Sherman, M., *Intelligence and Its Deviations* (New York: The Ronald Press, 1945).

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), Chap. VII.

Stoddard, G. D., *The Meaning of Intelligence* (New York: The Macmillan Co., 1943).

Terman, L. M. and Merrill, M. A., *Measuring Intelligence* (Boston: Houghton Mifflin Co., 1937).

Trow, William C., *Educational Psychology,* 2nd ed. (Boston: Houghton Mifflin Co., 1951), Chap. VIII.

CHAPTER 6

Some Aspects of Mental Growth

THE PREVIOUS CHAPTER was concerned with the nature and measurement of intelligence. The student of educational psychology should attain a clear understanding of the meaning of intelligence, methods used for measuring intelligence, factors influencing intelligence test scores, and some of the significant aspects of mental growth. Students are often confused regarding the relation of intelligence to such factors as heredity, environment, schooling, and general achievement. This results from attempts to isolate the influence of these factors upon the growth and manifestation of intelligence. It has been emphasized that growth results from these forces and conditions operating together. This concept will be further emphasized in this chapter. This chapter is especially concerned with the following aspects of mental growth:

The growth and function of memory
The development of language abilities
The development and enlargement of concepts

THE GROWTH AND FUNCTION OF MEMORY

The statement has been made that "childhood is the golden age of memory." Such a statement is misleading since it implies that memory ability reaches its peak during childhood. Some questions relating to the growth of memory include the following: What are some of the earliest indications of memory in the development of the child? How is the development of memory ability related to mental growth? What is the general nature of the growth curve for memory? Do growth curves vary with different types of materials? What factors in a learning situation affect memory? Some of these questions will be answered in the following discussions.

Early manifestations of memory. Signs of memory appear around the fourth- or fifth-month age level, when the child ceases crying at the sound of someone's approach or when he is about to be lifted from his crib. Charlotte Bühler found that five-month-old infants could remember for a few seconds a smiling face or a game played.[1] The development of memory ability represents an important aspect in the growth of the child, since this enables him to adjust his behavior in terms of objective stimuli that are not within his immediate environment. This is apparent in the case of the child ceasing to cry when footsteps are heard. Children improve in their ability to remember as they grow older, so that by the time they are two years of age they may be expected to remember people and things, that made an impression on them, for a considerable length of time. Bibliographical records of memory in preschool children have furnished useful information about the development of memory during the first several years of life:

1. Memory, of an impressionistic kind, appears in the first half year of life. The first instances of true remembrance appear by the end of the first year.
2. Memory, in the first year, is only aroused by a sensory stimulus, but, by the end of the second year, a sensory experience is no longer necessary to reinstate memory. It has developed into a more ideational type of experience.
3. During the first two years, memory is stronger for persons and objects than for situations. But, in the years from three to six, persons and objects in situations have become the significant factors in the child's memory.
4. Unusual events and things which are interesting to the child have a longer latency period than neutrally toned events. The emotional quality of the impression influences the memory of it.
5. The child recognizes and remembers colors and forms in the second half of the third year.
6. At the age of three years, the child is able after a few days to recount a story heard, and give detailed information about past experiences.[2]

The growth of memory ability. The speed with which children acquire a vocabulary and a fund of understanding indicates that the growth of memory ability is rapid during the preschool and early school years. In this connection memory may be classified as *immediate* memory and *delayed* memory. Most of the memory of children during the first two or three years may be termed immediate memory, although no hard-and-fast line can be drawn between the two general types. Learning may be said to occur as a result of the development of delayed memory ability. In a study of memory of two- to four-year-old children, Mallay measured the extent to which children could remember the technique involved in opening a series of boxes.[3] In the case of the performance of the simplest problem he found that the two-year-olds could remember the technique from about three to eight days, the three-year-olds from about nine to fifteen days, and the four-year-olds from about seven to twenty days.

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[1] Charlotte Bühler, *From Birth to Maturity: An Outline of the Psychological Development of the Child* (London: K. Paul Trench, Trubner and Co., 1935).

[2] E. B. Hurlock and R. Schwartz, "Bibliographical Records of Memory in Preschool Children," *Child Development*, Vol. 3 (1932), p. 238.

The development of delayed memory ability is used in various forms in the measurement of intelligence. The *Stanford Revision of the Binet Tests of Intelligence,* as well as other revisions of the Binet tests have made use of immediate memory ability in measuring intelligence. The increase in the capacity for repeating digits with age is shown in Table 6-1. These are standards for the different ages taken from the *Terman-Merrill Revision of the Binet Tests*. Some children have an immediate-memory span for digits larger than those given for their ages, while others have a span smaller than those listed. However, the increase in immediate memory ability with age is clearly shown in these results. This is an aspect of general memory ability and grows from early childhood to maturity.

TABLE 6-1. *The development of immediate memory ability for digits* *

REPEATING DIGITS IN ORDER GIVEN		REPEATING DIGITS IN REVERSED ORDER	
YEARS AND MONTHS	NUMBER OF DIGITS	YEARS	NUMBER OF DIGITS
2.6	2	7	3
3	3	9	4
4.6	4	12	5
7	5	*Superior adult* (I)	6
10	6		
Superior adult (II)	8		
Superior adult (III)	9		

* These are based on the norms for the *Terman-Merrill Revision of the Binet Tests*, 1937.

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[3] M. Mallay, "The Latent Memory Span of the Preschool Child," *Child Development*, Vol. 6 (1935), pp. 110-119.

The influence of age upon the learning of poetry and nonsense syllables was studied by Stroud and Maul.[4] The subjects used in their study consisted of 172 grade-school children, 26 ninth-grade students, and 23 college freshmen. The different age groups were approximately equal in intelligence as determined by their IQ's. The growth curve for memorizing poetry is presented in Figure 6-1. The memory curve for nonsense syllables is similar to that found for poetry, there being a rapid improvement in memory ability until around the fourteenth birthday. The results of this study have been substantiated by a number of studies bearing on this problem. The notion that early childhood is the desired time for memory work is not borne out by these studies. Rather, the curve of growth for memory ability tends to parallel that for intelligence.

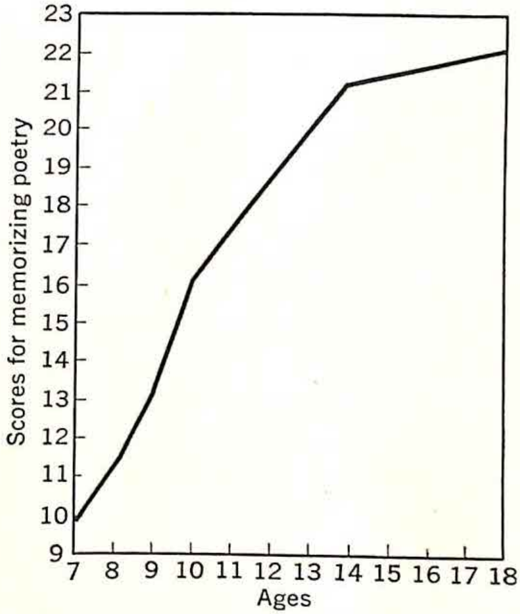

FIGURE 6-1. The relation of age to memorizing poetry

Memory, learning, and attention. The close relationship between memory and learning is obvious to students of education and psychology. Maturation, the development of language ability, and significant experiences are important factors associated with increased ability to remember past experiences. Present-day educators recognize that learning experiences and techniques should be in harmony with the maturational level of children at different age levels.

Closely related to the growth of memory is the growth of the ability of the child to center his attention upon a particular situation. The young child's ability to concentrate is much more limited than that of the preadolescent and adolescent. However, this ability will vary with different materials and under different motivating conditions. For this reason, it is very difficult to determine the extent to which the increase in ability to concentrate is a result of maturation and the influence of other factors. However, various studies bearing on this problem tend to agree on the following:

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[4] J. B. Stroud and Ruth Maul, "The influence of Age upon Learning and Retention of Poetry and Nonsense Syllables," *Journal of Genetic Psychology*, Vol. 41 (1933), pp. 242-250.

1. The average attention span is short at all age levels.
2. There is an increase in the averages from year to year.
3. The increase from year to year is gradual in nature, and at no year is there a marked or sudden rise noted.
4. There are pronounced individual differences in the attention span.
5. The length of time children persist in the performance of a task varies with the nature of the task.
6. The interest of the child in a task is important in relation to his attention and concentration upon it.
7. The ability to concentrate and stay with a task is an important aspect of his mental ability.

LANGUAGE DEVELOPMENT

After the first year of life, language development on the part of the individual child furnishes the most interesting and one of the best indices to his intellectual development. Some language is, of course, in evidence before the end of the first year. The incoherent babbling sound of the infant furnishes the basis for the formation of words. These early sounds are vocal responses to feelings of personal comfort and discomfort, and are very much in evidence in the emotional behavior of the infant child. The development of comprehensible speech takes place during the second year of life and reaches maturity at an early age (see Figure 6-2).[5] Thus, the child enters the kindergarten with comprehensible speech well established. The growth and development of language after this period is most important in connection

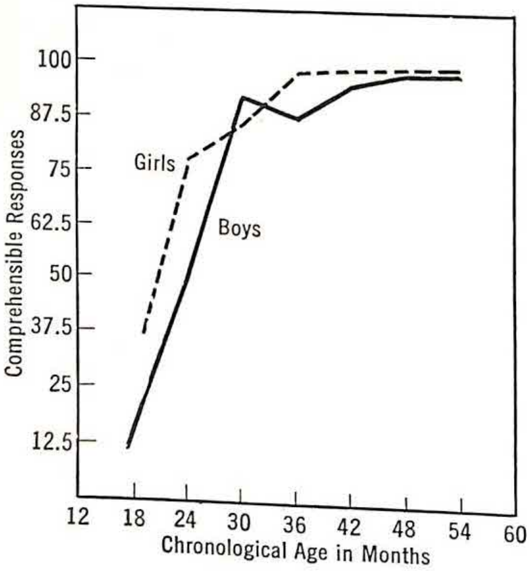

FIGURE 6-2. Mean per cent of comprehensible responses by chronological age and sex

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[5] Cecil V. Millard, *Child Growth and Development* (Boston: D. C. Heath and Co., 1951), p. 150.

with the child's educational and personal development. An understanding of the nature of language development during the elementary-school period should furnish a better basis for guiding the educational growth of the individual child.

From babbling to words. The age when the first word is spoken varies in individual children. Some children arrive at this one-word stage as early as ten months; however, the majority of children do not reach this stage until one or two months later. One of the reasons why investigators differ in their findings concerning the beginnings of speech results from the difficulty of distinguishing between babbling sounds and the first word. There is good evidence, however, that the vowels, particularly *a* and *u,* are used first, while such sounds as *f, r,* and *v* are last to appear. Parents, in particular, are likely to interpret certain early babbling sounds as words, since such sounds as *ma, pa,* and *da,* when repeated, tend to form such words as mama, dada, and papa. Questions may be raised about how babbling sounds become transferred into words. A partial answer lies in the fact that the child learns his native tongue—the language of his environment. The fate of the deaf child who fails to learn to talk, since he cannot hear the sounds made by others, emphasizes the importance of a model and imitation.

The importance of maturation in the development of speech has been investigated by a number of students of this problem. It was pointed out in Chapter 2 that if training is to be effective it must be in harmony with the individual's stage of maturation. In this connection, Lois Strayer found that a given amount of language training, at eighty-nine weeks of age, was more beneficial than similar training given at eighty-four weeks.[6] Using identical twins as subjects, she noted that the twin who at eighty-nine weeks had not been given special training, acquired within twenty-eight days a vocabulary which equaled that of the twin who had had five weeks of training previously. Furthermore, she noted that the response pattern of the twin, given the special training at the later date, was more mature than that for the other twin. It appears that the spontaneous sounds made by the child emerge in the child's life activities as a result of maturation, and that his acquisition of words will depend primarily upon the sounds that he hears and upon his maturational level.

The growth of vocabulary. A number of investigators have concerned themselves with the growth of the child's vocabulary. These studies contain valuable information about the nature and size of the average child's vocabulary, at different age levels. Studies of vocabulary growth during the preschool years agree that there is a rapid growth after the age of two years. The average child at age six may use approximately 2500 words. The rate of development of children will vary in their vocabulary growth as a result of such factors as heredity, home background, educational opportunity, and general experiences.

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[6] Lois C. Strayer, "Language and Growth: The Relative Efficacy of Early and Deferred Vocabulary Training Studied by the Method of Co-twin Control," *Genetic Psychology Monographs,* Vol. 8 (1930), pp. 209-319.

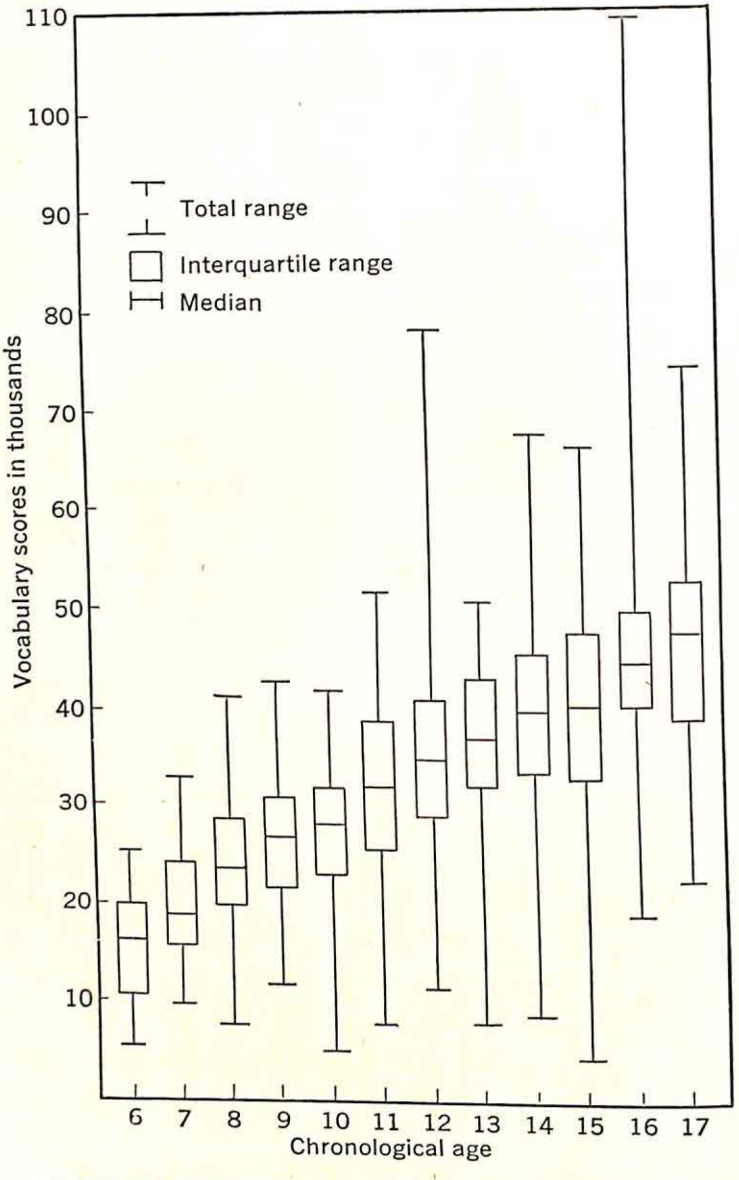

FIGURE 6-3. Basic vocabulary scores by chronological age groups

A number of vocabulary tests have been constructed, designed to measure the number of basic words understood or known at different age levels. Using the *English Recognition Vocabulary Test*, Smith found that the number of basic words known by first-grade children ranged from 5,500 to 32,800.[7] Results indicate a fairly steady growth of vocabulary throughout the school years. The findings from the study by Smith are presented in Figure 6-3 for further study. Two significant results are shown in this study. In the first place, growth in vocabulary is remarkably steady throughout the school years. Secondly, there are at all grade levels a wide range of differences in the size of vocabulary, indicating considerable overlapping between the students from the different grades.

Growth in length of responses. There is not only an increase in the size of the child's vocabulary with age, but there are pronounced changes in the type of speech used and the length of each response. At first the child's response might well be conceived of as a one-word response. This word usually is a noun. At a later stage verbs come to play an important role. After two years of age other parts of speech begin appearing in a constantly increasing number. He now refers not only to the "table" but may use such words together as "on the table." In this case his response has become longer and includes different parts of speech, which are necessary to express his thoughts and feelings. He now uses pronouns and adjectives, along with adverbs, more frequently, and forms more complex sentences as he develops from one age level to another. By the age of six the child has passed beyond three- or four-word sentences and is using practically every form of sentence structure. This achievement is especially noteworthy, when we realize that it takes place in such a relatively short period of time.

Materials presented earlier on comprehensible responses of boys and girls (Figure 6-2) show that growth in language proceeds more rapidly among girls than among boys. Data presented in Table 6-2, from a study by Heider and Heider, indicate that there is a continuous growth in length of sentences during the elementary-school period.[8] A further analysis of these data reveal that the average sentence length is longer at the different age levels for girls than for boys. The superiority of girls also holds for speaking plainly and for freedom from speech defects.

Imagination and language. Children of superior intelligence begin to talk earlier than less gifted children, although there will be wide difference

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[7] M. K. Smith, "Measurement of the Size of the General English Vocabulary through the Elementary Grades and High School," *Genetic Psychology Monographs*, Vol. 24 (1941), pp. 311-345.

[8] F. K. Heider and G. M. Heider, "A Comparison of Sentence Structure of Deaf and Hearing Children," *Psychological Monographs*, Vol. 52 (1940), No. 1, pp. 42-103.

TABLE 6-2. *Mean number of words per sentence in written composition*

AGE	GRADE	WORDS PER SENTENCE
8	3	10.2
9	4	10.9
10	5	11.1
11	6	11.1
12	7	12.8
13	8	13.7
14	9	13.9

among children of the same age level and of equal intelligence. This stems from the close relationship found between socio-economic factors and language development. Thus, regardless of intelligence, maximum language development is dependent upon an enriched and stimulating environment. Language, however, is the avenue whereby children are able to express their feelings, wishes, aspirations, and ideas. The immaturity of the preschool child oftentimes interferes with correct and coherent expressions. However, he should not be suppressed in his efforts to relate his experiences and wishes. The normal child gradually comes to distinguish between the real and the imaginary, so that by the time he has finished the second grade he is usually able to detect the realistic from the imaginary.

The early imaginative activities of the child show that he is able to use language for more than reproducing the words or phrases that he has encountered in his experiences. He uses sentences for defining his thoughts, his wishes, and his feelings, and for expressing them to others. Through language he brings together elements from various experiences and reorganizes them in creative activities and problem-solving behavior. The extent to which he is able to co-ordinate different aspects of his experiences in creative activities will depend upon such factors as his maturity, intelligence, stimulation, and type of guidance encountered.

THE DEVELOPMENT AND ENLARGEMENT OF CONCEPTS

At birth the child has no understanding of the world about him. As a result of maturation and learning he gradually develops a limited understanding of what he observes. Also, his environment becomes more meaningful to him. Since no two children have had the same experiences, no two children can be expected to have the same understanding of the things about them. These meanings, when organized into special categories or classifications, are referred to as concepts. The child's concepts of the world in

Library of Congress

Children are sometimes handicapped in their physical and mental growth by an impoverished environment

which he lives and grows consist of the ideas he associates with the things about him. These are further classified with additional experience.

The nature of the growth of concepts among young children was studied by Springer.[9] Eighty-nine four-, five-, and six-year-old children, who had received no formal instruction, were asked individually to draw a picture of a clock. These drawings combined with the remarks made accompanying the drawing activity were carefully analyzed to determine the development of knowledge of the features of the clock. Definite developmental trends indicate that performance in such numerical situations varies in a very regular and systematic manner with age. The youngest child found the tasks too difficult, while the flattening of the growth curve at the upper age limits suggests that the major development of the abilities involved in these tasks has occurred by the age of six or seven years.

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[9] Doris V. Springer, "Development of Concepts Related to the Clock as Shown in Young Children's Drawings," *Journal of Genetic Psychology*, Vol. 79 (1951), pp. 47-54.

A study by Coward was designed to trace the development of number concepts among three,- four-, five-, and six-year-old children.[14] Fifty subjects from each age group were given special tests involving numerical relations consisting of eleven parts—rote counting, counting objects, producing numbers, distinguishing numbers, number finding, number naming, number combinations, more or less, identifying figures, fractions, and simple problems. This test was given to each child individually. The mean scores for the four age groups are shown in Table 6-3; however, there was considerable overlapping as revealed by the range of scores for the different age groups. Performance on rote counting and object counting did not tally at any age level prior to six years, indicating that counting is largely a mechanical process without much meaning during these early years. In general, the concepts of comparative degree are well understood during these preschool years. "More than" offered the greatest difficulty among the younger children, and "fewer than" among the older ones. When counting and addition involved problems within the range of the children's experiences, the results were significantly better than when abstract problems

TABLE 6-3. *Performance of children on the tests of number concepts by age groups*

TEST ITEM	THREE YEARS		FOUR YEARS		FIVE YEARS		SIX YEARS	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
Rote counting	5.08	3.87	7.3	3.56	9.58	3.21	17.2	10.45
Counting objects	4.54	3.81	7.6	5.01	12.46	4.35	15.88	2.22
Producing numbers	2.12	.86	3.84	2.4	6.44	2.62	8.32	1.32
Distinguishing numbers	2.96	2.86	5.4	3.78	8.04	4.56	12.24	3.24
Number finding	8.64	4.35	9.9	4.02	12.12	3.93	14.36	1.78
Number naming	2.08	1.51	3.76	2.48	5.92	2.55	8.28	1.78
Number combination	1.22	1.42	2.24	1.78	4.44	3.47	9.44	5.13
More or less	3.48	1.06	3.8	.92	4.3	.85	4.4	.78
Identifying figures	.64	.50	1.14	1.71	2.92	3.45	6.36	4.00
Fractions	2.1	2.52	4.9	4.4	6.78	4.65	10.82	3.08
Simple problems	11.36	4.34	16.28	4.64	23.48	7.40	32.52	8.36
Total score	39.0	19.59	61.0	24.41	93.6	29.7	135.4	31.83

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[14] Elizabeth Coward, "The Development of Number Concepts in the Preschool Child." Master's Thesis (University of Minnesota, 1940).

were presented. This study agrees with other studies in that children know and use socialized concepts of numbers before they understand their computational value. Numerical situations make up a part of every young child's daily life, although some have richer experiences than others. These experiences are reflected in their responses to different tests of number concepts.

However, experiences with numerical situations are essential for such a development. One of the contributions of the modern nursery school and kindergarten is to furnish children with favorable opportunities to develop concepts, including number concepts. Through associating with other children and through working with different things where numerical terms are employed, numerical meanings are acquired and extended to a wider range of situations. Children working at a particular table are counted, the number of cups needed for milk are counted, and in many other ways numerical terms are employed.

Growth in understanding. As the child develops he becomes capable of understanding, and of more accurately interpreting the things in his environment. The interplay of maturation and experiences are again in evidence. In the *Terman-Merrill Revision of the Binet-Simon Tests,* pictures are used which fall within the range of children's experiences. At three and one-half years of age the average child enumerates the items of the picture; at six years of age he describes the items of the picture; and at twelve he is expected to correctly interpret the relationships of the picture. There is a gradual and continuous growth in understanding the picture from six to twelve years, the descriptions becoming fuller, figures of people are more clearly distinguished, and irrelevant details so evident among younger children are gradually omitted. Another part of this scale deals with the growth in the ability to perceive similarities and differences. At the ages designated these questions are asked:

> *Age 7:* In what way are wood and coal alike? Apple and peach? Ship and automobile? Iron and silver?
>
> *Age 8:* In what way are a baseball and an orange alike and how are they different? Airplane and kite? Ocean and river? Penny and quarter?
>
> *Age 11:* In what way are a snake, cow, and a sparrow alike? Rose, potato, tree? Wool, cotton, leather? Knife-blade, penny, piece of wire? Book, teacher, newspaper?

Errors based on simple comparisons of items for similarities and differences are very common among immature and slow-learning children. However, such errors are oftentimes based upon lack of experiences. A small child seeing a fur coat for the first time may show fear of it, since it is regarded as an animal. Meanings are of all degrees, from the vaguest to a fairly complete scientific understanding of a situation.

Teachers who do not understand the mental growth of children are likely to present them with concepts that are too difficult for them to understand. They depend largely upon verbalization, rather than the experiences and mental maturity of the children. In many cases the experiences of the children have not been sufficiently broad for them to grasp the concept. This is especially true in the realm of the social studies. This may be noted in the case of a discussion of the industrial revolution. The elementary-school child has gathered some information about the Revolutionary War, but this is a far-cry from the nature of the Industrial Revolution of a later period. Any interpretation by the child of the Industrial Revolution based upon his understanding of the revolutionary War would be quite unrelated.

Development of concepts of causal relations. The preschool child's explanation of causes of events will be very simple and concrete in nature. Multiple causation will seldom be found. An explanation of the cause of rain will be in terms of a single thing, such as the thunder, or the wind, which is concrete in nature and within the bounds of his experiences. A number of students of child development have concerned themselves with this problem. A study conducted by Deutsche is of special interest in this connection, since it dealt with a careful analysis of different types of explanations given at different age levels.[15]

Two types of analysis of children's causal thinking were made—quantitative and qualitative. Quantitative scores were obtained from the adequacy of the answer as an explanation of the phenomenon of such questions as:

What makes the wind blow?
What makes the frost on the window pane?
What makes water boil?

The mean quantified scores increased for each of the questions asked throughout the age range studied—eight through fifteen. However, the increase was greater for some of the questions than for others. These differences were undoubtedly related to the difficulty of the various questions. Also, individual differences within each age group were very pronounced. Such differences would normally be greater for the more complex questions than for the simpler ones.

A qualitative analysis of the scores also revealed wide differences. Four types of causal thinking were frequently observed. These include: phenomenistic causality, 20.8 per cent; dynamic causality, 6.3 per cent; logical deductions, 23.4 per cent; and mechanical causality, 38.9 per cent. The age curves for the two forms of the tests administered are given in Figure 6-5, for these four types of causal thinking. The two most striking changes noted in these curves are those involving phenomenistic explanations (in terms of the phenomenon itself) and those involving logical deductions. At eight years of age, from 30 to 40 per cent of the answers given were of the phenomenistic types; however, at the fifteen-sixteen-age level it included approximately 10 per cent. The growth in explanations of the logical deduction type is clearly revealed in Figure 6-5. This is to be expected, since increased mental maturity and additional experiences gives the child insight into problem situations that was not present at an earlier age. Thus, children should be guided in their experiences and in their understandings and interpretations.

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[15] Jean Marquis Deutsche, *The Development of Children's Concepts of Causal Relations* (Minneapolis: University of Minnesota Press, 1937).

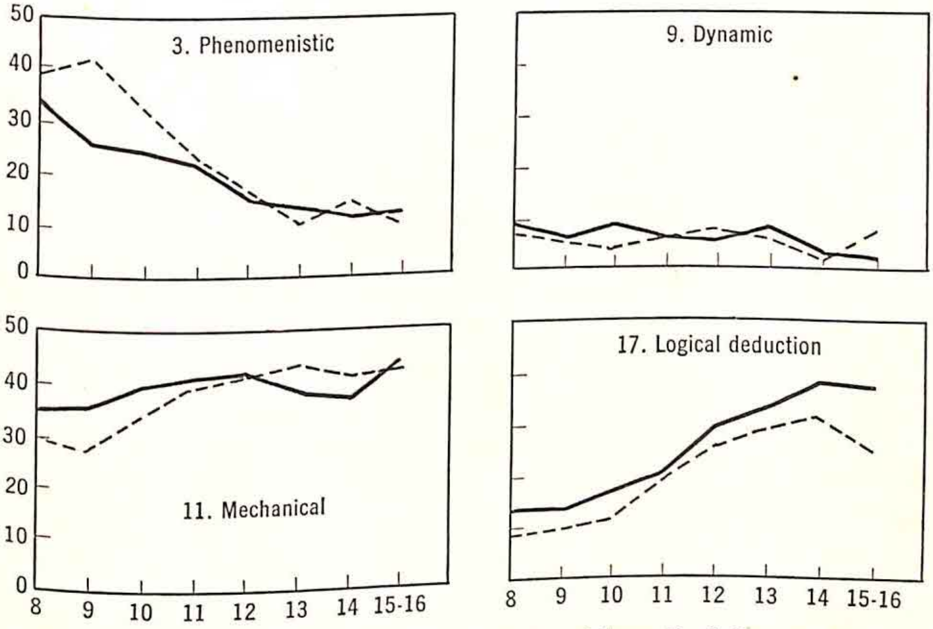

FIGURE 6-5. Percentage of answers on Form I and Form II of Causal Relations Questions falling into several classifications, according to age

The growth of problem-solving behavior. It was once believed that children were unable to solve problems, since they were too immature mentally. However, observations show that even babies are able to solve problems. When the baby is placed on his back he will attempt to change his position so that he may be able to see someone approaching. Numerous studies show that there are no distinct stages in the development of the child's ability to solve problems. One approach to this problem is to present a series of problems to children of different age levels. Thay may be asked such questions as: "What causes trees to grow?" The responses show that children at all age levels give a variety of answers to such questions.[16] At all age levels children are illogical and inconsistent in dealing with problems completely outside their realm of experiences.

A study conducted by Oakes revealed that the kindergarten child is able to offer solutions and methods of solving problems within the grasp of his maturity and experience.[17] Some kindergarten children gave better answers to questions about natural phenomena than did some of the sixth-graders. Tests of reasoning ability, given to children from grade three through grade eight, revealed that there is a constant and continuous growth in their literary reasoning capacity.[18] The tests used at the different grade levels consisted of giving the correct interpretation to different literary selections.

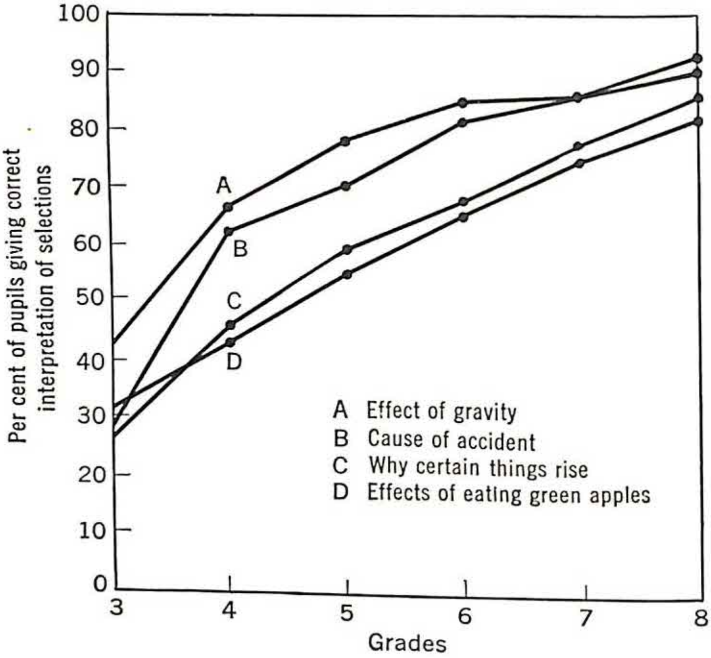

FIGURE 6-6. The development of literary reasoning capacity among children in grades three to eight, inclusive

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[16] *Ibid.*

[17] Mervin E. Oakes, *Children's Explanations of Natural Phenomena* (Teachers College, Columbia University, Bureau of Publications, 1947).

[18] W. H. Pyle, "An Experimental Study of the Development of Certain Aspects of Reasoning," *Journal of Educational Psychology*, Vol. 26 (1935), pp. 539-546.

The results of these tests in terms of the per cent of correct interpretations given by pupils at different age levels are presented in Figure 6-6. These results show that there is a continuous development of reasoning ability from age to age, although there is a considerable overlapping in abilities at each age level.

SUMMARY AND GENERALIZATION

The materials of this chapter have dealt with different manifestations of intelligence. It is important for the teacher to understand the nature of memory, language, and concepts. He must, further, understand their manifestations at different age levels, if he expects to successfully guide children in their general educational growth. The importance of experience has been emphasized in this chapter, although it has constantly been pointed out that experience and maturation must go hand in hand, if the best results are to be obtained.

The growth of memory ability follows the same general pattern that is found in other aspects of growth. Its close relationship to attention, intelligence, and learning, has been emphasized. Its relationship with language growth is evident when we realize that vocabulary growth depends in the final analysis upon memory ability. The child's language appears to develop out of his early babbling sounds. These sounds are put together to make the words that he hears in his everyday experiences. The close relationship between maturation and language growth is clearly observable in the development of talking. Delayed talking may result from one or more of the following: (1) retarded mental growth, (2) deafness or hard-of-hearing, (3) lack of contact with words useful to him, and (4) lack of environmental stimulation.

The growth of language is essential for the formation of many concepts, especially those of an abstract nature. The child's early concepts are quite simple in nature and are built around concrete things in his experiences. Lack of maturity or lack of appropriate experiences will hamper the acquisition of concepts. Studies show that the ability to estimate time and distance grows gradually. The ability to understand verbalized space and time is poorly developed in the preschool child. However, there is a rapid development of this ability during the early school years. Nursery-school and kindergarten experiences are most likely to be beneficial to the growth of such verbalized concepts. There is a gradual and continuous growth in the ability to understand relationships, to note differences, and to detect similarities. Such abilities are closely related to intelligence and have been used in the construction of intelligence tests. Causal explanations show both quantitative and qualitative changes with age. The early elementary-school child shows little tendency to use logical deductions in his explanations of causes for certain happenings or events. He relies upon a phenomenestic explanation. Again, maturation and experiences are essential. It is the task of the teacher to recognize the maturational level of the individual child and to guide him in experiences harmonious with this, so as to insure his optimum growth and development.

Questions and Exercises

1. Differentiate by example *immediate* and *delayed* memory. Tell something of the early memory of the child.
2. What evidence is there for the statement, "Childhood is the golden age of memory?"
3. How is memory related to attention? To learning?
4. What is meant by comprehensible speech? Trace the growth of comprehensible speech.
5. Show how language is a product of experience. How, then, does maturation influence the development of language? Can you cite scientific evidence for your conclusions to this problem?
6. How is imagination related to language growth? What factors affect the nature and direction of a child's imagination?
7. What are some of the characteristics of the preschool child's perception of space and distance? How would you account for this? Why do people often regard one's ability to estimate distance an inherited ability?
8. What can the teacher do to help the child acquire number concepts? What are some cautions which should be observed?
9. Show how a child's lack of understanding of a particular object or situation may result from inadequate experience with it? From lack of maturity?
10. Report the major findings of the study by T. J. Eskridge, Jr., *Growth in Understanding of Geographic Terms in Grades IV to VII* (Duke University Research Studies in Education, No. 4, 1939), or other pertinent study.

Recommended Readings

Breckenridge, Marian E., and Vincent, E. Lee, *Child Development,* 2nd ed. (Philadelphia: W. B. Saunders Co., 1949), pp. 393-426.

Brownell, W. A., and Hendrickson, G., "How Children Learn Information, Concepts, and Generalizations," *Learning and Instruction* (*Forty-Ninth Yearbook of the National Society for the Study of Education,* 1950), Part I, Chap. IV.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Co., 1952), Chaps. IX and X.

Gates, A. I. *et al.*, *Educational Psychology*, rev. ed. (New York: The Macmillan Company, 1948), Chap. VI.

Hurlock, Elizabeth B., *Child Development*, 2nd ed. (New York: McGraw-Hill Book Co., 1950), Chaps. X and XI.

Jersild, Arthur T., *Child Psychology*, 3rd ed. (New York: Prentice-Hall, Inc., 1947), Chaps. X and XI.

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Thorpe, Louis P., *Child Psychology and Development* (New York: The Ronald Press Co., 1946), Chap. XII.

CHAPTER 7

Social Growth and Character Formation

AT BIRTH the child's interests and activities revolve around the *self*. He has been described as egocentric in nature. His social growth follows the fundamental principles of growth and development set forth in Chapter 2. During early childhood, the individual child is largely dependent upon his parents for affection and care. At this stage he has little social concern. However, he emerges as a social being as a result of the many forces and conditions that he encounters. Closely related to his social growth is the formation of character. The importance of social growth and character formation is not always fully appreciated by those concerned with the education of growing boys and girls. It is the province of this chapter to describe some of the most important factors which affect social growth and character formation, and to trace the social growth of the child from early childhood through the period of adolescence.

SOCIAL GROWTH DURING EARLY CHILDHOOD

Although advance in social behavior cannot be divided into distinct stages, one may observe certain trends. The child is born into a home where specific forms of social behavior are practiced. Socialization, then, may be said to begin at birth. It is worthwhile for the teacher to realize that the child acquires ways of responding in group situations as a result of his experiences. It is also important for the teacher to understand the nature of the child's socialization at different age levels. An educational program must take into consideration this social development of the child at different stages, if it is to be sound and functional.

The beginnings of social behavior. The infant child of two or three weeks may appear to fix his eyes upon the mother's face and smile in response to her smile; however, it is improbable that social communication appears at this time. The studies by Gesell and others show that around the third or fourth month the infant displays signs of social awareness by smiling, laughing, and sometimes imitating sounds. Karl Bühler noted, however, that the child of three months is not able to differentiate between adult expressions of friendliness and anger, and that he may smile in response to either of these stimuli.[1] During the fourth month differences in learning ability becomes more observable and a few infants show some ability in discriminating between facial expressions, tones, and gestures.

The infant of four or five months is an amazing socialized individual in comparison with his socialization during the first two weeks following birth. Sounds and sight of persons have definite social meaning at this age. The responses of infants to adults, according to results obtained by Charlotte Bühler, appear early.[2] At two or three months they tend to return the smiles of adults, while at four or five months they are quieted by caressing. Bühler noted that in more than 50 per cent of the cases studied the infants followed a rather similar pattern in their development. The child's increased capacity for sustained attention, which accompanies his development, has an important bearing on his social development. At eight and nine months he may focus his attention on one person for a long period of time, and will show increased memory ability in his reactions to different members of this household. By the time the child has reached his first birthday he has developed many social skills. He smiles in response to the smiles of others and can play pat-a-cake and hide-and-seek when he is so moved.

The child's early development in social behavior has been reported in various ways. One nursery school study showed that in free-play situations there was a progressive increase with age in the amount of time spent in social contacts.[3]

2-year-olds spent 41 per cent
3-year-olds spent 64 per cent
4-year-olds spent 77 per cent

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[1] Karl Bühler, *The Mental Development of the Child* (New York: Harcourt, Brace and Co., 1930), p. 160.

[2] Charlotte Bühler, *The First Years of Life* (New York: John Day Co., 1930).

[3] H. Mallay, "Study of Some of the Techniques Underlying the Establishment of Successful Social Contacts at the Preschool Level," *Pedagogical Seminar,* Vol. 47 (1935), pp. 431-457.

In their social contacts, older nursery school children laugh and smile more than do younger children. During the early years most of the laughing and smiling occurs in connection with general motor activities rather than in connection with social contacts. At this time they often avoid play with others. At a later stage they seek attention and praise from others. This is shown in Figure 7-1.[4]

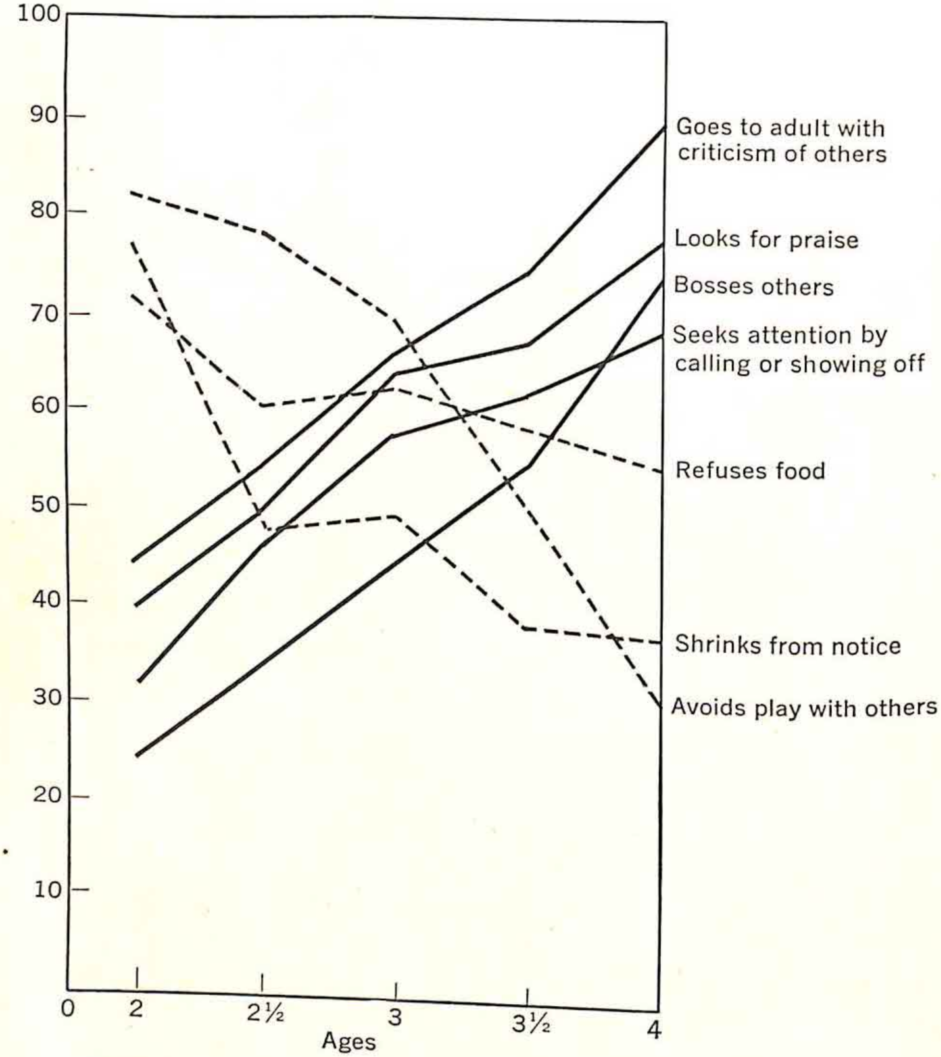

FIGURE 7-1. Developmental course of certain types of behavior

Co-operative behavior. Bühler early pointed out from studies of infant behavior that co-operative responses are more basic than competitive responses.[5] However, it is not until the child is about two years of age that he can on occasions co-operate in group play and follow instructions given by supervisors. The group should not be too large or the age range too wide, and it cannot be left to its own devices too long. In a properly supervised group, preschool children can learn much about getting along with people their own age—a lesson vitally important to preadolescents, adolescents, and adults.

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[4] L. A. Hattwick and Mollie K. Sanders, "Age Differences in Behavior at the Nursery School Level," *Child Development,* Vol. 9 (1938), pp. 27-47.

It was suggested earlier that two-year-olds play by themselves for the most part, conscious of the presence of other children, but making only fleeting contacts with one or two children at a time. A typical scene of two-year-old children on the playground shows Elizabeth and Betty Carol on opposite sides of a sandbox, each playing with sand but in no sense playing together; Annette, Sam, and Robert at the slide jostling each other in attempting to climb the steps and slide down again as fast as possible; and Jack, a "lone wolf" pedaling around on a tricycle, stopping every once in a while to watch the other children. The two-year-olds enjoy being in the group together, but their actual contacts with one another is not of a planned co-operative nature. They touch each other, hand over or take a toy, and then go about their own play. They exchange conversation and smiles, and may exchange harsh words and blows if conflicts or frustrations are encountered in their play.

The four-year-olds, on the other hand, will play together for longer periods of time with a minimum of supervision. This may be observed in planning and building activities or in dramatic and creative play. A typical scene with this age group would show Dickie, Allan, Nathan, Dotty, and Nancy in the midst of a pile of blocks playing train. Each child takes a part with some appreciation of the give-and-take involved in playing together. Furthermore, it will be observed that the children are now assuming specific roles. Differentiation of roles, based upon sex, oftentimes appears. In the play scene just described one of the boys will assume the role of the engineer, while another one may be the conductor. The roles assumed will be somewhat in keeping with that found in our social structure. Leadership characteristics will be in evidence, although indications of these may appear during the first two years. Leadership among preschool children is likely to consist of being a leader over a small group, usually two or three children. Then too, the role of leader and follower may vary with the nature of the situation. In any specific situation the leader must demonstrate a certain

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[5] C. Bühler, "Spontaneous Reactions of Children in the First Two Years," *Proceedings of the Ninth International Congress of Psychology* (1929), pp. 99-100.

Before 1st birthday

Moves about floor by crawling or creeping; plays with rattle and simple objects for quarter hour or so. Does not need constant watching, but likes attention; "asks" to have parents pick him up.

Before 2nd birthday

Eats with spoon from bowl or cup, without help or too much spilling. Chooses between suitable food and substances unfit for eating. Removes wrappers from candy.

Before 3rd birthday

Avoids simple hazards. "Comes in out of rain." Is careful about falling when on stairs and high places, avoids sharp edges, broken glass, etc., and should keep out of streets.

Before 4th birthday

Walks down stairs without help, one step at a time. Runs, skips, marches, and shows some sense of simple rhythm.

Before 5th birthday

Goes about neighborhood unattended; may be restricted as to areas or "deadlines" so that his whereabouts are known, but is "on his own" within this limitation. Plays in small groups of children of same age such games as tag, hide-and-seek, jump-rope, hopscotch, marbles, etc.

Before 6th birthday

Plays simple table games with others that require taking turns, observing rules, attaining goals, and does so without undue squabbling. (Games include tiddledywinks, parchesi, dominoes, etc.)

Before 7th birthday

At table: uses knife to spread butter or jam on bread. At play: cuts, folds, pastes paper toys. Sews crudely if needle is threaded. Cannot tie knot. Enjoys making simple figures in clay.

FIGURE 7-2. Illustrating various

(From E. A. Doll, *Your Child Grows Up*,

Before 8th birthday

Takes part in group play: boys prefer games that do not require much skill, such as unorganized baseball, or basketball, follow-the-leader, fox and hounds, hiking and bicycle riding. Girls prefer playing house, school, nurse-doctor, and other imitations of home and social affairs.

Before 9th birthday

Makes practical use of common tools such as hammer, saw, or screw driver; uses household and sewing utensils; handles simple garden implements successfully.

Before 10th birthday

Goes about home community freely, alone or with friends. There may be forbidden areas, but the restrictions do not confine the child's activities to his nearby neighborhood.

Before 11th birthday

Writes occasional short letters to friends or relatives on own initiative, or following mild suggestions. Does so without help except perhaps in spelling unfamiliar words. Addresses envelope and makes ready for mailing.

Before 12th birthday

Reads for practical information or own enjoyment stories or news items in papers, magazine articles, library book stories of adventure and romance.

Between 12th and 15th birthday

Takes part in games requiring skill, such as card games, basketball, baseball, tennis, pool. Understands scoring and sticks to the rules. Is an active member of athletic team or literary organization. Attends parties, dances, and other activities with children of own age without adult direction.

Between 15th and 18th birthday

Shows personal interest in the opposite sex; is interested in *a* boy or *a* girl, as well as in all boys or girls. Calls or receives callers; but "dates" may be restricted as to time, place, or circumstances.

stages in the development of the child

John Hancock Mutual Life Insurance Co., 1939) amount of ability in relation to the problems encountered in the situation, else he will not be able to continue in the role as the leader.

Competitive behavior. Growth of competitive behavior tends to parallel that of co-operative behavior; however, each type of behavior is an outgrowth of conditions and forces present in the child's social structure in which he lives and grows. Studies by Leuba of rivalry among preschool children revealed that competition becomes more noticeable as children increase in age.[6] Children aged two to six years were brought individually and in pairs into a room. Each child was given a peg board with which to play. The children were instructed to place the pegs in the holes of the peg board. Following that no further comments were made and little attention was directed toward them. Records were kept by an unseen observer of each child's success in placing the pegs in the holes of the peg board, reactions to the situations, and general comments made during the performance. The two-year-olds did not seem to be affected by the presence of another child. The four-year-olds were aware of the presence of others and would make comments about excelling the other child, or similar remarks indicating a slight recognition of rivalry. However, their performances were poorer when working in pairs than when working alone, indicating that they were somewhat distracted by partners. Nearly all of the five-year-olds did better when they worked in pairs than when they worked alone. Every child of this age level, except for a foreign-born child, gave evidence of rivalry at some time during the performance. No sex differences in the expression of rivalry at any age level were observed.

There is considerable evidence, based upon cultural anthropology as well as upon genetic studies of children, that rivalry develops in accordance with home and community forces encountered by the child. A number of biologists and social scientists have emphasized the existence of a complex of organic drives or basic needs for co-operation in living organisms.[7] Combativeness and competition arise, according to this viewpoint, primarily from the frustration of the need to co-operate. Those who have visited among the Eskimos or aborigines in Australia are often amazed at the lack of competitiveness. Mead has pointed out that members of certain tribes in New Guinea are strikingly noncompetitive in their relations with each other.[8] It is interesting to note in the study by Leuba that rivalry was found among all of the American-born children, where competition is part of the social structure from the first year of life, while no signs of rivalry were observed in the foreign-born children's performances.[9] It has furthermore been noted that a child might be highly competitive in one group and quite co-operative in another, depending largely upon the demands and structural composition of the particular group. While the mass of evidence indicates quite clearly that competition and co-operation develop in children in accordance with cultural conditions and demands, their importance as motivating forces in learning and development can hardly be denied. This will be discussed at length in Chapter 11.

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[6] Clarence Leuba, "An Experimental Study of Rivalry in Young Children," *Journal of Comparative Psychology*, Vol. 16 (1933) pp. 367-378.

[7] See especially Ashley Montagu, *On Being Human* (New York: Henry Schuman, Inc., 1950).

[8] Margaret Mead *et al., Cooperation and Competition Among Primitive Peoples* (New York: McGraw-Hill Book Co., 1937).

Appreciation of others. There are several ways to teach children to develop sympathy for and an appreciation of others. Learning to live with others, to share experiences, to take turns, and to work together on common problems, are parts of the child's character development resulting from maturation and experiences. The teacher can, however, guide the child in his experiences so that he will develop those habit patterns essential for good social relations. Perhaps the first essential is for the teacher to be relatively free from personal problems. The teacher who is frustrated, or who is so engrossed in her own personal problems that she is unable to comprehend the children's problems in relation to their background is not in a favorable position to guide children in their social development. An important element in the child's social development is that of solving difficult personal problems. Once these have been solved, guidance in social development is much easier. The use of the socio-drama technique has been found useful in helping the child understand the needs and problems of others. One child who was inclined to "bully" other children was given the role of a child who was mistreated by two of his classmates. Playing this role enabled him to better appreciate the feelings of the child who was mistreated. This seemed to have had a beneficial effect upon his behavior.

If the teacher expects to be successful in the guidance of the child's social development he must look beyond the classroom into the home and community problems that the child faces. The school has set up rather specific learning situations to which pupils are expected to respond. Most children learn to respond favorably to these situations, all of which becomes an acquired *school behavior*. This, however, does not usually carry over into most home and community situations.

The teacher can help to bridge this gap by working for increased transfer of learning, the methods of which are presented in Chapter 16. The teacher may also explore the nature of these out-of-school problems. By understanding the background of such problems she is better able to cope with them. One twelve-year-old youngster resented the fact that he oftentimes had to look after a baby brother at night when his father and mother went out for the evening. When the boy was led to see that only through his care of the baby were his parents able to enjoy some social recreation, he took a different attitude toward the situation.

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[9] C. Leuba, *op. cit.*

Influence of language development. The child's social growth is profoundly influenced by his language development. Through language he not only expresses his thoughts and feelings to others but he understands something of their thoughts, feelings, and desires. Thus, language enables the child to understand others better and gives him a ready means of influencing their behavior. A great amount of conversation may be observed in a group of preschool children at play, even though much of it may relate only to the speakers and their exploits. Language is perhaps less important for the social life of the preschool child than for the preadolescent and adolescent. At this stage it becomes a major means for making social contacts. Much of the social behavior of such groups consists of conversation or physical activities in which language is used. The interrelation of language development and social growth is another illustration of the principle that all growth is interrelated.

Nursery-school and kindergarten experiences. Studies of the effects of nursery-school attendance show that the experiences encountered there are beneficial to the child in the development of emotional control and the ability to enter into social contacts.[10] The importance of such experiences will depend largely upon the needs of a particular child. The preschool child who does not have the opportunities to play with other children is most in need of nursery school and kindergarten experiences. If such opportunities are delayed until he is six years old he will be at a loss when he enters school, especially if he has not acquired the skills and play techniques used by the group with whom he is in close contact at school. Such a delay often means the beginning of the "isolate"—the withdrawing type of child. On the other hand, if the child has learned some of the skills and techniques before he enters school, and if he has had some opportunities to play with children of his age level, he may within a relatively short period of time become an active participant in the activities of his group.

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[10] A. T. Jersild and M. D. Fite, *The Influence of Nursery School Experience on Children's Social Adjustments* (Teachers College, Bureau of Publications, Child Development Monographs, 1939), No. 25.

Play and social growth. At one time there were a number of educators who looked upon play as a waste of time. It is now recognized that play behavior has a number of important values, one of which is to enhance the social growth of the child. Furthermore, the nature of the play life of a group of children furnishes an index of their social growth. Prior to the ages of three or four much of the play of children is of a parallel nature; in which each child plays with his particular toy or toys and gives little attention to the presence of other children. This type of play is worthwhile in the child's social growth. Later he learns to share the things about him and recognizes that other children have certain rights when they play some simple game together. Often a child of this age plans a play activity and gets another child to play with him. At this stage he is learning that certain benefits result from playing together, results that cannot be secured through solitary play—a fundamental lesson in social growth. At five, six and seven years of age, children play together in groups of six to ten for quite long periods of time. They do not need close supervision at this stage, as they are usually able to work out their own problems and difficulties without adult interference. Thus, we note that play continues to have real value to the child in his social growth. During the early school years children learn many games. They learn to give and take, and find themselves playing particular roles. Leadership ability emerges in the play activities at this time; status is established; and the individual comes to understand himself better in relation to the various members of the group.

FROM CHILDHOOD TO ADOLESCENCE

Formation of groups and associations. Out of the loosely organized activities of preschool children develop larger and more stable group activities. Six- and seven-year-old children are drawn together in their school and play activities. From the ages of eight to ten boys and girls frequently form clubs of one sort or another. Many of these are short-lived. A name, a time and place of meeting, a list of members, and no very definite purposes are common characteristics of most of these clubs. Boys' clubs seem to be more definite in purpose and more lasting in nature than are the girls' clubs. Tattling is common during the early school years. Doing things for the good of the group, as in team work, develops gradually.

Around the ages of eleven, twelve, and thirteen the size of the groups expands. There is a rather complete separation of the sexes: boys join boys' groups and girls have their own cliques. Secret passwords, special badges, rules and regulations, initiations, elected leaders, and specific purposes or activities characterize the preadolescent groups. At this time most of the play activities are carried on away from the home. A high degree of loyalty to fellow members of the group develops, especially among boys. Although many of the individual's needs are satisfied through membership in some group, there is still a need for the experiences of affection and security provided by parents and teachers. When important decisions are to be made, or when unusual difficulties are encountered the preadolescent will seek help and assurance from some adult, providing favorable relations have been previously established. The extent to which a child looks to the group for the satisfaction of basic needs, such as security and affection, will depend in a large measure upon the ways and the extent to which these needs have been satisfied in his home and school relations.

The nature of the activities carried on in the group, the purposes of the group, and the ways in which they influence the members will determine whether or not its influences are good or bad. Children, who are secure in their home life and who have the affection and esteem of their parents without too much parental protection, will seek group activities for the sake of enjoying sports, friendships, and other worthwhile activities; while neglected children or rejected children will seek the group as a source of refuge, a place for receiving recognition and attention, and as a source of security. The activities of this latter group of children may be largely antisocial in which they defy law and order and engage in stealing, vandalism, and other forms of petty offenses. Participation in group life is a sort of preparation for adolescence and adulthood. It is through these activities that boys learn to get along with boys and the girls learn to enjoy the social activities of girls. The ideals of childhood tend to carry over into the later years of life; they prepare the individual for a life of service and helpfulness, or for a life of misdemeanor and crime.

Social-sex development. It was once believed that the child was nonsexual and that the sexual urge or drive remained dormant until the time of the glandular changes signifying the appearance of adolescence. It is now generally recognized that sex feelings as well as sex drives have their beginnings early in life. This recognition has brought about a changed attitude toward the social-sex development of children. The modern school attempts to direct the child's growth in his understanding of sex differences and sex feelings, rather than assume an attitude of censorship toward all ideas, feelings, and actions related to sex.

The manner in which a preadolescent reacts to sex situations will depend largely upon the attitudes formed during his earlier years. Thus, there will be important differences in the social-sex pattern found in different groups, and even for different members of a particular group. In an effort to arrive at a better understanding of the development of the social-sex patterns of boys and girls, Elsie Campbell conducted a careful study of the social-sex attitudes and behavior of boys and girls in the Merrill-Palmer recreational clubs.[11] A social-sex scale was used to record the different observations. Behavior which characterizes boys during the period from nine to fourteen years include:

1. Some pursuit games such as informal tag may be played with girls.
2. Boys rather than girls are generally chosen to be with and sit next to in most situations.
3. Self-consciousness in the presence of girls grows during this period.
4. Boys who date at this age are likely to be teased and ridiculed by the other boys.

The social-sex development of girls from eight and one-half to thirteen years of age is characterized by the following types of behavior:

1. During the early stages the girl shows no special interest in the activities of boys.
2. The girl sits next to girls rather than boys when she is able to make a choice. She prefers men to boys.
3. Girls classify games according to sex—boys playing certain games, girls playing other games.
4. Considerable modesty is displayed. Toward the latter period she displays much interest in clothes and certain social activities involving boys.

The preadolescent period. Although life is oftentimes divided into such periods as preschool, childhood, preadolescence, adolescence, and adulthood, there is no specific line of separation between these. The preadolescent period may be thought of as the latter part of childhood or a transition stage between childhood and adolescence. Even the adolescent does not leave behind him all or even most of his childhood characteristics. There are, however, certain characteristics which are present in most boys and girls at different stages in their development. Some of these characteristics result largely from the sequential order of physiological maturation, while others are more closely related to cultural forces operating upon the individual at the particular stage in his growth. It seems clear that the characteristics ascribed to preadolescents are a result of these interrelated forces. The best preparation for adolescence involves favorable development during childhood and preadolescent years. The schools should, therefore, concern themselves with problems that face boys and girls at the present. Such a notion is based upon the principle that training for meeting tomorrow's problems is best provided by guiding the individual in solving the problems that he is encountering today.

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[11] Elsie H. Campbell, "The Social and Sex Development of Children," *Genetic Psychology Monographs,* Vol. 21 (1939), pp. 461-552.

The preadolescent is faced with a number of developmental tasks in his social growth. He must learn to get along with his peers. He must assume an ever-increasing responsibility for the solution of his problems. He must resolve conflicts that emerge between the teachings at home, at school, and among his peers. He must make satisfactory adjustments in his school achievements. He must learn to play his sex role as a part of his preparation for adolescence.

Importance of peers. The child is born into a home where certain customs, beliefs, and values exist. He is therefore given a status from the very beginning of life. After having been given this status, there are two groups of people from whom he gets his beliefs, sentiments, knowledge, and ways of behaving. These persons provide direction for his socialization. These two groups include the child's peers and those who have authority over him, usually his parents and teachers. A third group may include people in a different class structure, but with whom he has little personal contacts. Both authoritarian and equalitarian relationships contribute to the socialization process of the growing child and prepare him for life in a democratic society. The authoritarian element is concerned with the guidance and education of the child. It is made necessary by the fact that behavior patterns essential for harmonious living in our society are not innate, but are often in conflict with the child's natural tendencies. The importance of individual guidance and discipline will be discussed in Chapter 20. It is worthwhile for those concerned with child training to recognize that guidance and discipline have a fundamental place in the socialization of the growing individual.

As boys and girls grow toward maturity they are often faced with many conflicts and difficulties. They feel that their parents are often unsympathetic with them in their efforts to solve their problems. They also feel that they are commonly misunderstood. They likewise feel that teachers are either not interested in their special problems or have little understanding of them. The fact that teachers have already met or by-passed their problems may suggest that they regard the conflicts of growing up as unimportant—problems that time will adequately solve. Problems of dating, social approval, making friends, being accepted, and the like, are real to growing boys and girls. When they are unable or unwilling to secure aid from their parents, teachers, and other adults, they turn to their peers for sympathy and help. The importance of peer relations during adolescence when many personal and social problems appear has been emphasized by Caroline Tryon. She states:

> If we are to examine the major developmental tasks which confront boys and girls in late childhood, during adolescence, and in later adolescence, it would become apparent that many of these can only reach a satisfactory solution by boys and girls through the medium of their peer groups. It is in this group that *by doing* they learn about the social processes of our culture. They clarify their sex roles by acting and being responded to, they learn competition, cooperation, social skills, values, and purposes by sharing the common life.[12]

SOCIAL EXPERIENCES OF ADOLESCENTS

There are wide variations in the physiological development of adolescent boys. This may be observed among seventh- and eighth-grade youngsters, where about two-thirds of the boys are still in different stages of preadolescence. The problem of planning social activities for these grades is still further aggravated by the fact that the girls are developing more rapidly than the boys. Within these grades approximately two-thirds of the girls will have reached pubescence.

Pubescence and changed attitudes. The period of adolescence has been characterized by instability in performances and in changed attitudes toward the self and members of the opposite sex. These changes are further reflected in the attitudes of adolescent boys and girls toward preadolescent brothers, sisters, and classmates. The boy or girl who deviates very much from the average in his physical growth at this period is faced with far-reaching problems. His attitudes toward his peers and his interests are often out of line with that of most of the members of the group. He may find himself an "isolate" at times due either to his own attitudes and desires or to the attitudes assumed toward him by other members of the group.

There is good evidence that changes in interests and attitudes are closely related to increased hormone secretion from the sex glands. No longer does the boy look upon the girl as someone to keep out of his games. On the contrary, he begins showing a special interest in her, although he may try to hide it in order to not be teased about some particular girl. He may resort to various devices to get the attention of the girls. It is at this time that he begins to display a special interest in his own personal appearance.

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[12] Caroline M. Tryon, "The Adolescent Peer Culture," *Forty-third Yearbook of the National Society for the Study of Education*, Part 1, *Adolescence* (Chicago: University of Chicago, 1944), Chap. XII. Quoted by permission of the Society.

This changed attitude appearing at this time is emphasized in a study by Jones and Bayley, in which comparisons were made between two groups of boys equal in chronological age but approximately two years apart in skeletal development.[13] This comparison of the two groups showed that the early-maturing boys were in all age brackets from twelve to seventeen above the average in matter-of-factness and in being unaffected. As would be expected, the early-maturing boys displayed a greater interest in personal grooming, and were rated ahead of the late-maturing boys in personal appearance. The results of this study have been borne out by a number of other studies on this and related problems. According to a study by Sollenberger the degree of maturity of the expressed interests and attitudes of adolescent boys correlate higher with hormone activity than with chronological age.[14] A comparison of the responses of a high- and low-hormone group of boys on "Things Wished For" showed those of the high-hormone group to be on a higher plane of reality than those of the low-hormone group. A comparison of the two hormone groups on the items, "Things to Do," is presented in Table 7-1. Note that there is a significant change of interest toward dating, dancing, and other social activities involving girls, with increased hormone activity.

TABLE 7-1. *Comparison of the responses of the high- and low-hormone group on the items, "Things to Do." (The C. R's give the reliability of the difference in which the items of the first column were most frequently chosen by the high-hormone group)*

THINGS TO DO			C.R.
Bowl	or	Fly kites	1.0
Read novels	or	Play, "Follow the Leader"	1.6
Listen to a band playing	or	Make Candy	2.5
Play "Parchesi"	or	Play "I Spy"	1.2
Go out with a girl	or	Play with Meccano	1.2
Read sport news	or	Play checkers	3.8
Play soccer	or	Play with electric trains	1.1
Take a walk with a girl	or	Erase blackboards	1.3
Drive an auto	or	Go to Scout meetings	1.8
Go out with a girl	or	Chew gum	1.6
Go visit a girl	or	Wade in the water	1.3
Go to a dance	or	Play croquet	2.0

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[13] Mary Cover Jones and Nancy Bayley, "Physical Maturity among Boys as Related to Behavior," *Journal of Educational Psychology*, Vol. 41 (1950), p. 137.

[14] R. T. Sollenberger, "Some Relations between the Urinary Excretions of Male Hormones by Maturing Boys and Their Expressed Interests and Attitudes," *Journal of Psychology*, Vol. 9 (1940), pp. 179-189.

Although the studies cited refer to changes and attitudes among boys, the same developments take place, of course, in girls at the onset of pubescence. These changes appear at an earlier age for girls than for boys and aggravate the socializing problem in the seventh, eighth, and ninth grades. In their reading interests girls choose books bearing on romance. In their activities they prefer things involving both sexes. At this time they tend to give up sports and make an intense effort to be ladylike and play the feminine role.

Formation of friendships. Since the problems and needs of adolescents draw them together, at this stage close friendships are formed. Cliques are formed, with some adolescents failing to be included in any clique. Childhood friends are drawn largely from the same neighborhood and from the same room in school. As the child grows older, propinquity loses its supreme importance and other factors appear. There is a tendency on the part of preadolescents to select friends of the same chronological and mental ages. Among older adolescents, Jenkins noted that similarity of interests and a similar socio-economic background are important factors.[15] Girls, in particular, tend to choose friends from a similar socio-economic background. Boys are somewhat more democratic in their choice of friends and formation of groups, although their best friends usually come from a similar class group.

Among boys and girls at this age level are those who may be termed "isolates"—individuals who for one reason or another have no close ties with other members of the group. In a study conducted by Wisenbaker sixty-six ninth-grade girls were asked to list their first four choices of friends. Some results from this study are presented in the sociogram of Figure 7-3.[16] These results are typical of what one would expect to find among girls in general. Several closely united cliques may be observed in this study. In each of these there is one girl who ties the group together. This girl may be thought of as the leader of the clique, and in one or two cases was also chosen by a number of other cliques, which tended to broaden her leadership influence. Five girls were not chosen by any member of any group, and in no instance did either of these five choose each other. Most of the choices made by these girls were for girls not in the junior class. Some of these girls chose boys, although the instructions implied that the choice was to be for girls. A careful study of the "isolates" revealed that they failed to participate in class projects of various kinds, school clubs, and lacked confidence in experiences involving social skills. However, there was no single pattern which characterized the "isolate." The non-isolates were found to be more stable emotionally, to have fewer absences from school, to have a greater variety of interests, to be more interested in being with people and

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[15] G. G. Jenkins, "Factors Involved in Children's Friendships," *Journal of Educational Psychology*, Vol. 22 (1931), pp. 440-448.

[16] Mary Alice Wisenbaker, "A Study of the Factors Related to Social Isolation Among High School Girls with Implications that Social Adjustment May be Improved." Master's Thesis (University of Georgia, 1952), p. 32.

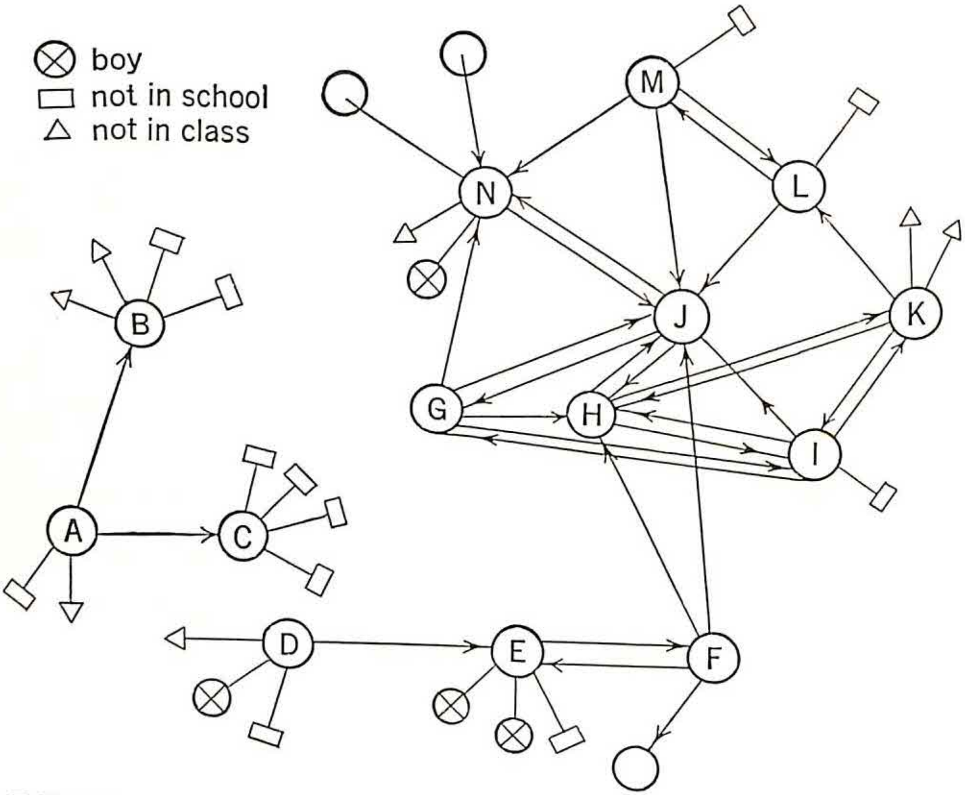

FIGURE 7-3. Sociogram showing certain friendship patterns of girls from a junior high-school class

sharing experiences, to participate in class and extraclass activities to a greater degree, and to come from homes with higher socio-cultural standards.

It is clear that there is a need for the school to attempt to help the "isolate" make satisfactory adjustments, where such adjustments are lacking. There are perhaps cases where the "isolate" is personally adjusted in activities which do not involve group enterprises. Certainly all "isolates" are not mental hygiene problems. The school has a unique opportunity to help children and adolescents in their social and character growth through understanding the needs and problems of each individual and attempting to meet them through carefully organized experiences and sound guidance.

Stability of friendships. The factors upon which friendships are formed early in life are not sound enough for them to be very lasting. However, as propinquity tends to give way to common interests, goals, and needs, there is a greater stability of friendships manifested. This has been shown by Horrocks and Thompson in a study involving 533 girls and 436 boys.[17] The relationship between age and the percentage of boys and girls choosing the same person as their best friend on two different occasions is shown in Figure 7-4. For both boys and girls there is a decided tendency toward an increased stability of friendship with age. The girls showed a greater increase than the boys, which is in harmony with the tendency for girls to form closed cliques to a greater extent than boys.

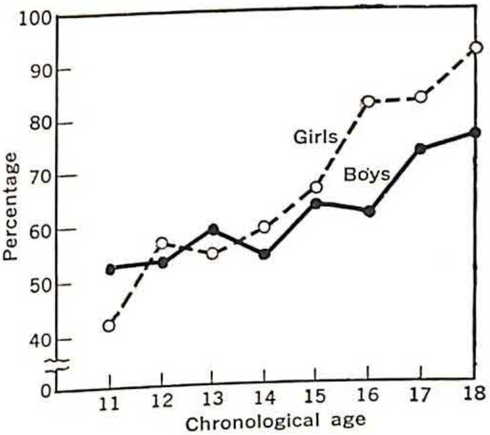

FIGURE 7-4. The relationship between chronological age and percentage of boys and girls choosing the same person as their best friend on two occasions separated by a two-week interval

Reaching social maturity. Maturity is often looked upon as full physical development. However, it was suggested in Chapter 4 that the degree of one's emotional control is a measure of his emotional maturity. There are also certain behavior activities which characterize the socially mature person; although not all adults display these characteristics. Thus, maturity is a relative term. The typical child tends to display these characteristics to an increased degree as he passes into the preadolescent stage. Some of the activities which characterize the socially mature person include the following:

1. Exercises mature judgment on crucial problems and issues.
2. Is able to carry on co-operative activities on a fair and sound basis.
3. Assumes personal responsibility for his actions.
4. Has a wide range of friends, chosen on a sound basis.
5. Displays independence in judgment and action, but with due regard for the rights and opinions of others.
6. Is able to take an objective attitude toward the self.

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[17] J. E. Horrocks and G. G. Thompson, "A Study of the Friendship Fluctuations of Urban Boys and Girls," *Journal of Genetic Psychology*, Vol. 70 (1947), pp. 53-63.

7. Is able to adjust to different situations—practices a certain amount of "role flexibility."
8. Thinks and plans in terms of long time goals rather than in terms of the immediate.
9. Is not self-centered in his conversation and in his actions.
10. Evaluates issues and problems in terms of the welfare of the group rather than how they are going to affect the *self*.

FACTORS AFFECTING SOCIAL GROWTH

At any age level a child's social behavior will be influenced by a number of factors. Since there are many which affect his social development, one cannot predict with much certainty the type of social behavior which will be exhibited by a particular child. There is, however, a sufficient stability of habits once acquired to make some fairly accurate estimates about how a child will respond to a specific situation on the basis of knowledge available about how he has responded in the past to somewhat similar situations. The influence of a number of the most important factors which affect the social growth of the child will be discussed in the subsequent materials.

Hereditary factors. Since the schools have no control over the hereditary factors affecting growth and development, there is oftentimes a tendency to eliminate them from any discussions of growth. This sometimes leaves students with the impression that the hereditary factors are of no special importance. It was pointed out in Chapter 2 that heredity and environment operate together in affecting the individual. This is true in every aspect of his social growth. Hereditary differences operate from the beginning of life, although it is not always easy to trace just how these influences develop. Important differences in the social responses of children have been observed by Gesell and others during the early months of life. Furthermore, vast differences appear among children from the same family. These differences must be taken into consideration by parents, teachers, and others concerned with the guidance of children in their social growth.

In the development of social behavior patterns, it is virtually impossible to designate just when they first occurred and the part maturation and learning played in their development.[18] It is useful, however, to know about the timing of various activities, the sequential order in which they appear, and the type of training appropriate for their fuller development.

The interrelationship between a child's physical and motor development and his social development are largely dependent upon the society in which he lives. This may be observed in the case of Ben reported by Stolz and Stolz.[19] Ben was carefully studied from the time he was in the fifth grade until he had passed through the adolescent period. He was precocious in his physical development and was large for his age. This tended to make his parents, friends, and teachers expect about the same things of him that they did of older boys of his size and physical development. This presented him with difficult roles, which he struggled to achieve.

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[18] See Joseph B. Cooper, "Learning and Social Behavior: A Point of View," *Journal of Social Psychology*, Vol. 32 (1950), pp. 31-43.

There were times when he was unable to measure up to the roles and goals which were set for him by others or which he had adopted from them. Such a condition may have had an adverse effect upon Ben's social development. If Ben had been reared in another environment where the roles expected of a child were not so completely based upon how grown-up he looked, the results upon his social development would have been very different.

Family influences. The most important factor in the personal-social development of the individual child is the family. First, the family furnishes the child with his earliest steps in socialization. Second, the family group is personalized in nature. There is usually a close relationship between the different members of the family, with many of their activities being emotionalized. This is reflected in the habits of the family, in the manner in which discipline is administered, how they observe religious occasions, and in the attention given to each other in times of sickness, and the like. Third, the influence of the family is continuous and over a long period of time. It begins with birth and usually extends even beyond the death of the parents. Fourth, the family ideals, desires, goals, and values are everpresent and are transmitted to the child. These may conflict with those found elsewhere, and in some cases conflict within the family circle. This conflict of ideals itself is a factor in the socialization of the individual child.

The general pattern of the family is important. This includes such factors as the age of the parents, number of children, sex of children, ways of arriving at decisions on the activities and welfare of the family. It is in the family that the child first feels the influence of authority. It is here that his activities are restricted and his freedom limited. The manner in which this authority is administered is important in the socialization of the child.

The effect of parents' treatment on the behavior of their children was studied by Grant.[20] Five characteristics of parental behavior were studied.

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[19] H. R. Stolz and L. M. Stolz, *Somatic Development of Adolescent Boys* (New York: Macmillan Company, 1951), p. 61.

[20] Eva I. Grant, "The Effect of Certain Factors in the Home Environment upon Child Behavior," *University of Iowa Studies in Child Welfare,* Vol. 17 (1939), pp. 61-94.

The ratings of these characteristics were correlated with the ratings of certain types of child behavior. Since such ratings are not highly reliable, one would not expect high correlations; however, some interesting and useful relationships were indicated. The correlations presented in Table 7-2 furnish good evidence that a home which fosters social awareness, encourages the development and expression of ideas, and is logical and consistent in its treatment of the child makes for self-reliance, resourcefulness, and habits of responsibility among the children. As a converse to this, the overprotected child lacks self-reliance, is unable to play in groups, displays nervous habits, is inclined toward sadism, and is insecure.

TABLE 7-2. *Significant correlations between rated home characteristics and rated pupil behavior**

HOME CHARACTERISTICS	PUPIL BEHAVIOR										
	Self-reliance	*Resourcefulness*	*Responsibility*	*Perseverance*	*Co-operativeness*	*Play in groups*	*Security*	*Ascendancy*	*Sadistic*	*Selfishness*	*Nervous habits*
Logical scientific	.57	.52	.49	.45							—.40
Encourage development and expression of ideas	.40	.60	.39	.42	.50						
Foster social development			.47		.55	.64					
Calm, happy, home life					.44	.54	.64		—.49		—.61
Overprotected	—.43					—.54	—.63	—.53	—.56		.73

* Adapted from the study by Grant.

The social class of a child's family determines not only the neighborhood in which he lives and the group with whom he associates and plays, but also the goals, aspirations, and social skills of the individual child. Although there are frustrations among children from all economic groups, the frustrations of children from homes of poverty have greater social significance, since they lead to aggressive acts which in turn lead to the courts. Stealing and immorality are outlets often resorted to by children from the lower economic groups in their efforts to adjust to frustrations; while more socially acceptable outlets are usually found by those in better circumstances. A study by Emil Heinz was concerned with class status and adjustment problems of junior-high-school pupils.[21] She found that class status was most important in connection with pupil adjustment in the areas of curriculum, relations with school administration, and the social life of girls. It is at this time that "isolates" among girls appear in large numbers. Lower-class boys showed a strong desire to leave school and felt that teachers overemphasize good order and conduct, and fail to appreciate their efforts and good school work.

The importance of class status on the socialization of the child must be understood by those concerned with his training, if the optimum results are to be obtained. The failure of so many teachers to understand this with children from underprivileged environments is perhaps the source of more teacher-pupil problems than any other single factor. Allison Davis has shown that class differences appear in the training of children during infancy and persist throughout childhood and adolescence.[22] It is of paramount importance for teachers to learn about the values, outlooks, aspirations, and socialization processes found at different levels in our social structure.

The role of the school. There is a common assumption that children who read a great deal are not socially acceptable to their classmates. The validity of this assumption was tested by Mitchell with 873 sixth-grade pupils as subjects.[23] Social acceptability was measured by the *Guess Who? Test.* Scores for each child were obtained from a tabulation of the number of times each child was mentioned by his classmates as indicating the behavior described by the items in the different categories of the test. The study revealed that children who read extensively were as socially acceptable as those who did not read widely. This study offers no evidence for the widespread notion that: (1) bright children read too much; (2) extensive reading makes children antisocial; and (3) that superior reading skill and superior intelligence are essentials for the enjoyment of reading.

The role of the school in the child's social development will depend largely upon the philosophy, goals, and procedures of the school. The school must first of all contribute to the satisfaction of the needs of growing boys and girls, if it is to have a beneficial effect upon their social development. Although it may have as its goal the inculcation of desirable patterns of social behavior, its program will be ineffectual if it fails to consider the aspirations and needs of the pupils and if it is not administered in harmony with the characteristics and abilities of the learners. The guidance of the social development of the pupils should follow sound principles, some of which are the following:

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[21] Emil Heinz, "Adjustment Problems of Class Status," *Phi Delta Kappan,* Vol. 30 (1949), pp. 290-293.

[22] Allison Davis and Robert Havighurst, "Social Class and Color Differences in Child Rearing," *American Sociological Review,* Vol. 11 (1946), pp. 698-708.

[23] Mary Alice Mitchell, *The Relationship of Reading to the Social Acceptability of Sixth Grade Children* (Teachers College, Columbia University, Contributions to Education, No. 953, 1949).

1. The methods and goals of the school should be in harmony with the needs and aspirations of the pupils.
2. The activities should be organized in harmony with the maturational level and social-cultural background of the pupils.
3. Guidance of the child's social development should be positive in nature and should be conducted in a democratic manner.
4. Children should be encouraged to display initiative, to accept responsibility, and to make their own decisions about problems where they are personally concerned.
5. Opportunities should be provided for the pupils to participate in activities designed to promote favorable social growth and development.
6. The program of the school should be closely related to other activities and programs of the community.

Democratic *versus* autocratic leadership. There is evidence from the study of the early social climate of adults that aggressive behavior and instability are related to childhoods dominated by authoritarian control. Where the father or mother was the dominating (authoritarian) force in the home, the children obeyed, but their lives were filled with tension and frustration. A number of studies have shown that the nature of the experimentally-created social climate (autocratically or democratically controlled) affects the behavior of children. Three groups each, of five ten-year-old boys, engaged in mural painting, model airplane construction, theoretical mask-making, and the like were studied.[24] The leader of one group assumed an authoritarian manner, telling the boys just what to do, how to do it, with whom to work, and then remained aloof from the work. The second group was handled in a democratic manner. The leader of the third group assumed a *laissez-faire* attitude. He permitted the boys to do as they pleased, did not participate in the discussions or work, and had few suggestions to offer. The behavior of the three groups of boys was carefully studied. In the club meetings the authoritarian-club members developed an increasingly aggressive, domineering attitude toward each other and an attitude of submission toward the leader. The behavior of the democratic-club members toward each other was characterized by friendliness and fact-finding. This group was more spontaneous in its responses and assumed a free and friendly relation with its leader. The *laissez-faire* group "ran wild" and displayed little persistent effort toward a goal, whether the leader was present or absent.

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[24] Ronald Lippitt, "An Experimental Study of the Effect of Democratic and Authoritarian Group Atmosphere," *University of Iowa Studies in Child Welfare*, Vol. 16 (1940), No. 3, pp. 43-195.

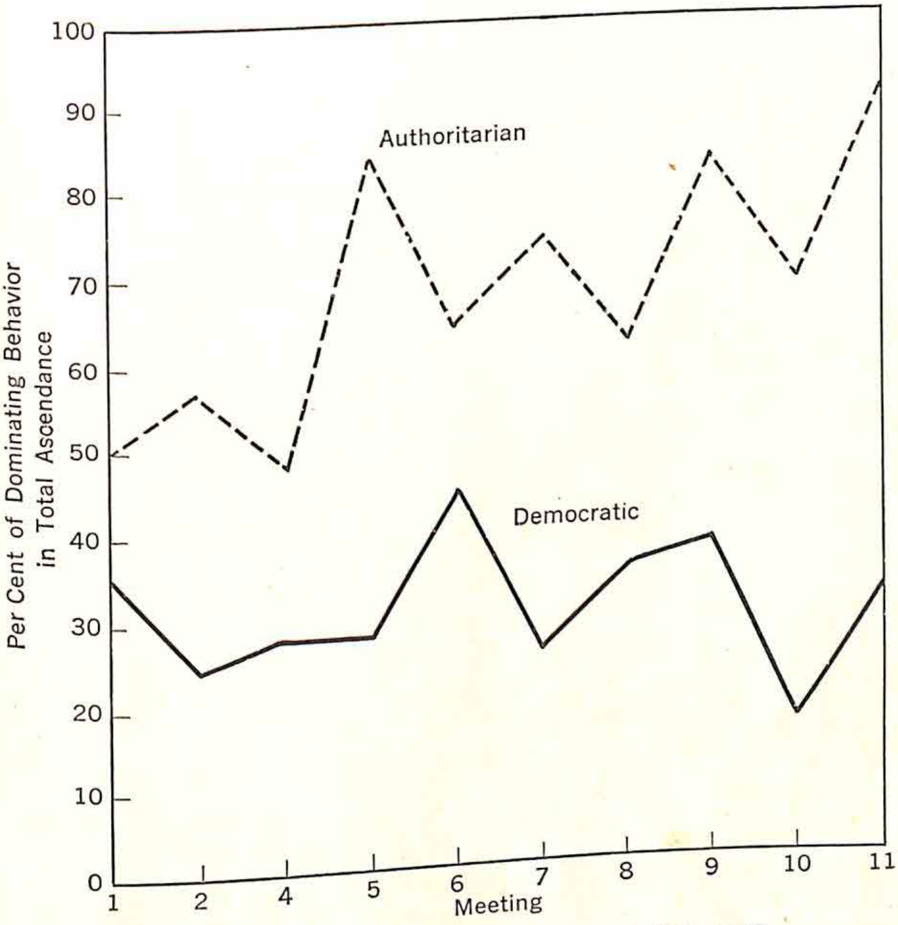

FIGURE 7-5. Dominating ascendance (child-child)

A further comparison of the authoritarian and democratic types of control revealed certain significant differences.[25] The trend of the authoritarian, indicated in Figure 7-5, was to produce a progressively greater proportion of dominating ascendance of the child members toward each other from the time of the first meeting to the last; while the democratic group tended to show about the same or less behavior of this nature during this time. This relationship of the two groups, shown in Figure 7-6, is reversed when the components of friendly and objective ascendant behavior is studied. In the case of submissive behavior it was noted that the authoritarian members were more submissive toward the source of authority, but less submissive toward each other, than were the democratic members. About one-fifth of the democratic group's in-group reactions were submissive, as compared to more than one-seventh of the authoritarian group's in-group actions. The contrast between the two groups is even greater in out-group interactions, being 18 per cent for the democratic group and 7 per cent for the authoritarian group.

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[25] Kurt Lewin, Ronald Lippitt and Sibylle K. Escalon, "Studies in Topological and Vector Psychology I," *University of Iowa Studies in Child Welfare*, Vol. 16 (1940), No. 3.

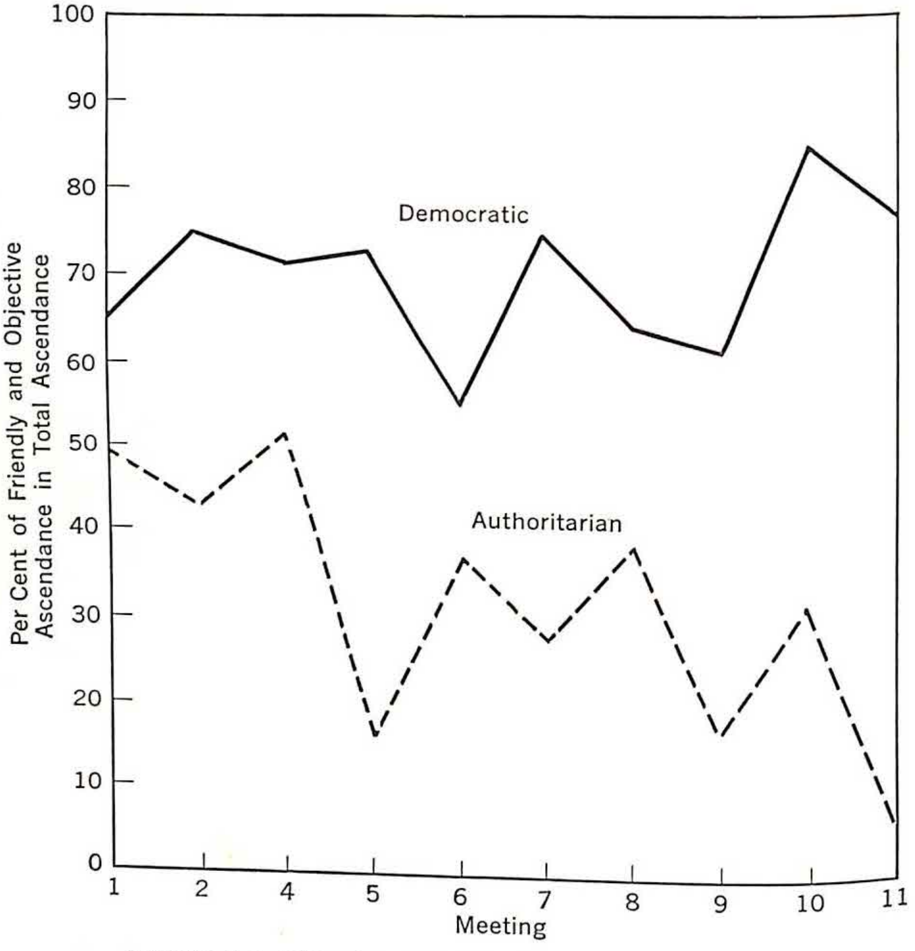

FIGURE 7-6. Objective and friendly ascendance (child-child)

Importance of group dynamics. The kindergarten and early elementary-school years are characterized by much loosely organized behavior, in contrast to the organized behavior which appears at ages ten to eleven. For the early elementary-school child most organized boundaries are quite temporary in nature, and must be held together by the action of the teacher, otherwise they tend to fall apart.

Too often organization results in regimentation. When there is too much regimentation children do not develop in the most desirable manner as citizens of a free society. In many cases, our schools, churches, playgrounds, camps, and other agencies concerned with child development become so large that the individual child is lost in some form of regimentation. Organized activities for preschool children that lead to regimentation are definitely harmful. The most important element in any educational situation is that of the interrelationships of the group. This has in recent years been referred to as *group dynamics*. The group is more than so many separate people working and playing together. The constant and mutual interchange of ideas, feelings, and desires tends to affect every member of the group as well as the whole. Group dynamics is most effectual when the group is small enough that the action of each member influences the behavior of each and every other member. The social development of the individual child will be most effective when the face-to-face influences of every member of the group are not destroyed through activities that are highly regimented.

MANIFESTATIONS OF CHARACTER FORMATION

Character formation begins very early in life. It is at all stages interrelated with social growth; therefore much of the discussion of social growth includes certain aspects of character formation. Like social growth it has its beginning in infancy and develops in harmony with various cultural forces which the child encounters. It is the product therefore of the interaction between the living child and his environment. It may be stated as a general postulate that character is largely lacking in the child during early infancy. Its nature and formation will depend upon the hereditary characteristics of the individual child and his reactions to conditions and forces in his environment.

Aggression and character development. Aggression appears as a fundamental characteristic of all living organisms. This is one of the factors that distinguishes the animate from the inanimate. It is this elemental characteristic that enables the organism to reach out and mold its environment for the satisfaction of basic needs and the sustainment of its own life. As the infant emerges from undifferentiated mass action to more specific types of behavior he is brought under the control of the physical and social forces about him. He must learn to direct his behavior in harmony with the realities of life. He is not equipped by heredity to satisfactorily meet and cope with the elements in his environment. Thus, he is constantly faced with serious conflicts. This may be observed in connection with hunger. In our society he will be fed partially upon a schedule rather than at any time a hunger pang is experienced. It is the ways in which he learns to meet conditions about him that habit patterns, which may be referred to as character, emerge. Emphasis upon aggression in the emotional growth of the child is essential for a deeper understanding of the integrating and differentiating nature of character growth.[26]

Any observer of children is aware of the conflicts which appear among them. The causes of quarreling and conflicts may be quite simple, such as accidentally bumping into each other. The preschool child quarrels and fights frequently when he plays with others of his age level. These early conflicts are of short duration, many times lasting only a minute or two. Preschool children seldom hold any resentment for any long period following a conflict. Appel noted that approximately 36 per cent of conflicts among preschool children centered around the possession of property, while another 23 per cent was the result of intrusion and rejection of companionship.[27]

Conflicts continue to occur between children as they grow older and are much in evidence during their years in the primary grades of the elementary school. They are caused by factors similar to those in evidence at an earlier age. Conflicts occur less frequently as children approach adolescence. This results from lessons which children have learned in social relations rather than because of physiological changes.

Moral growth. Children reflect the values, ideals, and practices of the adults with whom they come into contact in their everyday lives. Very early in life a child learns to submit to adult demands, even though such demands may be contrary to his own desires and wants. He learns that "no, no" means "he must not," and he learns to accept certain forms of behavior.

During the process of learning what he can do and what he cannot do, according to adult standards, a child is likely to display many emotional outbursts, since there are constant interferences to the satisfaction of certain needs or wants.When he arrives at the nursery school he brings with him habit patterns which are somewhat in harmony with actions acceptable to his parents. However, here he learns that certain things are not acceptable which were acceptable at his home. He furthermore learns that certain impulses must be controlled in order to carry on a co-operative educational program involving many other children. By the time he reaches the third or fourth grade in school pressures and fears involving social behavior have become an important part of his moral and social life. The child learns both from adults and his peers what types of behavior are acceptable and what types are not acceptable. This learning is a fundamental part of his moral growth.

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[26] See Frederick A. Allen, "Aggression in Relation to Emotional Development, Normal and Pathological," *Mental Hygiene*, Vol. 34 (1950), pp. 353-363.

[27] Madeline H. Appel, "Aggressive Behavior of Nursery School Children and Adult Procedures in Dealing with Such Behavior," *Journal of Experimental Education*, Vol. 11 (1942), pp. 185-199.

Social stratification and moral standards. The moral standards of the child are influenced by the social group to which his family belongs. Different social groups have different practices, which have their impact even during the period of infancy. This is reflected in the feeding practices, training in bladder control, and general supervision given the child during the early years. Again, the family's economic condition will affect the size of house, the amount of play space available, and the amount of travel that the family may do. Harrower noted that children of lower socio-economic status were somewhat more authoritarian and punitive in their attitude toward certain forms of socially-disapproved behavior than were children from better economic circumstances.[28] They regarded certain types of behavior as inherently wrong rather than harmful because of its consequences. For example, cheating in itself was harmful rather than because of the unfairness related to the self or others. Also, children of lower-economic status expressed the opinion that children who had damaged something should be punished for the act, while those from a higher status often expressed the opinion that they should repair the damaged object. These differences in moral standards are further reflected in the conduct of children and their reaction to educational guidance. Children from the lower status expect punishment and authoritarian control of their activities to a greater degree than do children from a better status.

The results of scientific studies show ways in which children from different socio-economic groups tend to differ in their moral standards; however, such differences will not be found in all cases or even in all communities. There are wide variations between individual families of the same socio-economic group as well as between different groups. It is important, however, for the teacher to be aware of these differences so that he may be better able to adjust his activities in harmony with the standards of the groups with which he is concerned. Furthermore, an understanding of the attitudes and values of the pupils will enable the teacher to better interpret their behavior. For example, it is less symptomatic of antisocial behavior for a boy to want to fight when he is a member of a group where this is an acceptable form of reaction to certain frustrations than for a boy to want to fight when he is a member of a group that looks with disfavor on such action.

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[28] M. R. Harrower, "Social Status and the Moral Development of the Child," *British Journal of Educational Psychology*, Vol. 1 (1934), pp. 75-95.

Influence of the home. The presence or absence of parents have an important bearing on the character development of the child. The parent most frequently absent is the father, since their vocations require them to be away from home a considerable amount of time. In some industrial areas many fathers are employed at night work and sleep during the day when the children are normally awake. A search for the effects of the absence of one or both parents will disclose that the degree of immaturity or conflicts in the character of the children is in direct proportion to the total amount of absence of otherwise withdrawal of the parents.[29] Forced physical separation of a parent from a child by war, economic circumstances, health, or death deprives the child of the *nurturing* influence of that parent during a vital period of his development. If the mother is the sole or chief influence, too much "momism" is sometimes the result, and this is devastating to the development of habits of initiative and responsibility—essential elements in good character development.

There are other factors about the home which are most important for the moral development of the child. Harmony between the parents is especially important for the child's security and happiness. It is in the home where the child receives a favorable or unfavorable impression of parents and the family. One study has been made to test the hypothesis that character development is largely determined by affectional family relationships.[30] Character ratings were obtained by means of special tests on five traits—honesty, moral courage, friendliness, loyalty, and responsibility. A revised family-relationship (F-R) questionnaire covering ten different areas of family interaction which were thought to reveal affectional family relationships were also used. Correlations were then computed between a weighted character score and the various areas of the F-R questionnaire. These correlations are presented in Table 7-3.

A positive relationship was found between each of the areas of the F-R questionnaire and the character reputation score. This indicates that the hypothesis that good family relationships are very important in character development is correct. The family-relationships areas more closely related to a good-character reputation score are *Sharing in family decisions, Attitude toward peers,* and *Interparental relations.*

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[29] Morris D. Riemer, "The Effect on Character Development of Prolonged or Frequent Absence of Parents," *Mental Hygiene*, Vol. 33, (1949), pp. 293-297.

[30] A. W. Brown, Joan Morrison, and Gertrude Couch, "Influence of Affectional Family Relationships on Character Development," *Journal of Abnormal and Social Psychology*, Vol. 42 (1947), pp. 422-428. Table 7-3 is reproduced by permission of the journal and the American Psychological Association.

TABLE 7-3. *Correlation between the areas of the F-R Questionnaire and the character-reputation score*

F-R AREA	CORRELATION
1. Common participation	.31 ± .07
2. Degree of approval-disapproval	.31 ± .07
3. Regularly in the home	.24 ± .07
4. Confidence shared	.35 ± .06
5. Sharing in family decisions	.45 ± .06
6. Trust and faith	.26 ± .07
7. Acceptance of home standards	.34 ± .06
8. Attitude toward peer activities	.42 ± .06
9. Interparental relations	.42 ± .06
10. Signs of tension	.14 ± .08

Influences of agencies outside the home. An effort to list all the forces outside the home which influences the character of the growing individual would be almost an endless task. It might be stated as a general truth that *the child is a result of his heredity interacting with everything that he meets in life.* The type of institutions will vary with different communities. Some of the most important institutions concerned with character development will include the church, school, recreation center, and special youth organizations. Also, there are many unorganized activities found in every community which have an important bearing on character development. The effectiveness of these agencies will depend in a large measure upon the following:

1. The character of those employed by these institutions and agencies.
2. The consistency and soundness of the goals and purposes of these organizations.
3. The extent to which these organizations reach boys and girls and provide satisfying experiences for them.

Time element in character formation. In order to become socialized the child must learn to acknowledge and to accept authority outside of himself, some controller of conduct that may appear unreasonable, but that is based upon established practice. He must learn to behave in certain fairly well-established ways which are regarded as appropriate to his sex status and social class. He must also learn to accept the complicated and largely ritualized acts which are sanctioned by law and prescribed by the rules of social living.[31] These lessons must be learned during the early years if they are to become a potent factor in character development. Attitudes and character develop over a period of time, as a result of the incubation of impressions from one's experiences. One of the great dangers of modern training is that of continuous stimulation of children, thus affording them little time to integrate and organize their experiences into a unified whole. Unless children are given time for free play, free action, and creative thought, they are likely to become confused rebels in a dynamic society which calls for steadiness of character. Concerning this Gregg has stated:

> In exaggerating the importance of environment, which is the sum total of stimuli, we often forget to allow time for the formation of character, which involves the organization and the expression of response to stimuli. By crowding the input, we spoil the output.[32]

SUMMARY AND GENERALIZATION

Social growth and character formation tend to follow the principles of growth set forth in Chapter 2. However, the problem of predicting, guiding, and assessing social growth is more complex than that for physical and mental growth. Its beginning may be observed during the first several months of life when the infant child, by smiling, responds to the attention of his mother or some other adult. Language growth and development enhance his social growth, since it gives the child a well-formed medium for transmitting his thoughts, feelings, and desires to others.

Play and other recreation activities involving a number of individuals are very important in the child's social and character growth and development. There are vital lessons learned through play activities that cannot be learned otherwise. It is through these activities that children learn to live harmoniously with each other.

Home relationships and environmental forces and conditions contribute to the development of good or poor social habits. The most important single factor in the home which influences a child's character is the attitude of the parents toward each other and toward him. The broken home, the home faced with conflicts, the home with undesirable parents, tend to establish undesirable character traits, each in its own way. The church, the school, and the playground are important community agencies and forces which stimulate favorable social and character growth of the child. The importance of peer relationships has only recently been recognized. Community agencies foster these and attempt to satisfy the needs of growing boys and girls in ways more satisfactory than gang activities do. The importance of education and guidance in social growth and character formation should be emphasized in a well-organized functional school program.

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[31] Hortense S. Cochrane, "Emotional Aspects of Social Adjustment for the Child," *Mental Hygiene*, Vol. 32 (1948), p. 592.

[32] Alan Gregg, "A Contribution toward the Study of Character Building in Children," *Mental Hygiene*, Vol. 33 (1949), p. 535.

Questions and Exercises

1. Explain how social growth tends to follow a sequential order during infancy and the preschool years.
2. How is social growth and character growth related? What distinction would you make between them?
3. Describe an ideal school situation for the social development of the elementary-school child. What are some factors and conditions included in your description which are not found in the traditional school situation?
4. Adult leadership may vary from completely *democratic* to completely *authoritarian*. To what extent should the age of the child influence the type of leadership needed? What other factors would influence the type of leadership needed?
5. Describe some "isolate" of your past or present acquaintance. What can the classroom teacher do to help the child who has no friends, become more socially acceptable?
6. Consider two junior-high-school pupils of the same sex, one of whom is very popular while the other one is not. What are the major differences in the personality and background of these pupils? Are the differences here noted compatible with the results of scientific studies bearing on this problem?
7. Consider the items listed on page 149 relative to essentials for an institution to become a potential force in character development. What other items would you include? Why is the school often not as effectual as it might be?
8. What are some dangers involved in an overemphasis on social growth? What are some of the major hazards encountered in directing the social growth of a child?
9. Should the schools encourage or discourage the development of difference in behavior between the sexes? Give reasons for your answer.

Recommended Readings

Bossard, James H., *The Sociology of Childhood* (New York: Harper & Brothers, 1948).

Crow, Lester D., and Crow, Alice, *Educational Psychology* (New York: American Book Co., 1948), Chap. VII.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Co., 1952), Chap. XII.

Hurlock, Elizabeth B., *Child Development*, 2nd ed. (New York: McGraw-Hill Book Co., 1950), Chap. X.

Jersild, Arthur T., *Child Psychology*, 4th ed. (New York: Prentice-Hall, Inc., 1954), Chaps. V and VI.

Merry, Frieda Kiefer, and Merry, Ralph Vickers, *The First Two Decades of Life* (New York: Harper and Brothers, 1950), Chap. X.

Newcomb, Theodore M., Hartley, Eugene L., and others, eds., *Readings in Social Psychology* (New York: Henry Holt and Company, 1947), Chaps. III, VI, VII, VIII, IX, and XI.

Olson, Willard, *Child Development* (Boston: D. C. Heath and Company, 1949), Chap. VIII.

Reynolds, Martha, *Children from Seed to Sapling* (New York: McGraw-Hill Book Co., 1939).

Skinner, Charles E., ed., *Educational Psychology*, 3d ed. (New York: Prentice-Hall, Inc.), Chap. IV.

Thorpe, Louis P., *Child Psychology and Development* (New York: The Ronald Press Co., 1946), Chap. XIII.

CHAPTER 8

Interests, Attitudes, and Values

THE PRECEDING CHAPTERS have emphasized the fact that the individual grows as a unified whole and that there are many aspects of growth. The conventional school has too often been preoccupied with achievement in the school subjects, largely to the exclusion of other aspects of growth. Recent studies in psychology and sociology have demonstrated the importance of individual and group dynamics. Studies in psychology and biology have emphasized that growth at all stages is based upon the interaction of hereditary and environmental forces and conditions. The interests, attitudes, and values of a particular child are dependent upon his biological nature and the culture which he has encountered at various stages in his life. If boys and girls are to achieve worthwhile and satisfying interests, values, and ideals, educational opportunities must be provided whereby these become a part of their learning. These learnings are just as real and perhaps more significant than those of arithmetic, history, science, and other school subjects.

"Why does David want to see the big giraffe when he visits the Zoo?" "Why does Joan want to spend the day with her aunt in the nearby town?" "Why does Don like his science teacher but dislike his English teacher?" These are important questions and the answers are to be found in learnings that have taken place in the lives of these boys and girls. It is the province of this chapter to—

1. Give the student a better understanding of the nature and development of interests, attitudes, and values,

2. Provide the student with a better insight into the interests, attitudes, and values of boys and girls at different stages of their development, and
3. Show the student the relationship between education and the formation of interests, attitudes, and values.

INTERESTS: THEIR NATURE AND DEVELOPMENT

The significance of interests. Although the existing interests of a particular child may be faint or limited in scope, they furnish the basis for possible expansion toward new experiences. Take the interest of a ten-year-old boy of Utah in a copper mine, which he has recently visited. Such an interest can lead to a wide range of learning activities such as a study of copper mining in other areas of the world, other type of mines, the uses of copper, and the like. The objective of the teacher should be to find out more about the nature of children's interests so she can relate the school work more closely to such interests. In this way educational activities become personal, worthwhile, and meaningful to the individual child.

The presence of interest in a school activity tends to insure increased attention and learning on the part of the pupils, while its absence leads to boredom, restlessness, and poor learning. The teaching of spelling and writing becomes much easier when the boy or girl writes a letter to Santa Claus or an invitation to his parents to attend a school play in which he participates. Boys have little trouble learning to add and subtract when making change for customers on a paper route. The learning of physics is enhanced when the pupils are able to see its use in many situations around the home and on the playground.

The role of learning. One must not infer from the foregoing discussion that interests appear as some innate or mysterious force ready-made for the teacher to use in guiding the pupil in his school work. Actually, interests are learned as is the case for any other learning process. Furthermore, they are not learned as something separate and apart from certain motor skills, concepts, and habit patterns. They are an integral part of any learning which is satisfying to the individual concerned. The pupil will develop an interest in counting when it helps him figure out how many cousins he has, or how many days are left until his next birthday. The child who has spent a pleasant summer vacation in the White mountains of Vermont will show an increased interest in mountains and the things which he associates with them. Thus, an educational policy of utilizing existing interests in promoting learning may be somewhat misleading. Certainly any sound learning procedures will attempt to develop more interests. The experience of the child while singing should promote a wide curiosity about music in general.

The experiences of the pupil in a civics class should lead to an increased interest in community activities and government.

A child's interest in a particular object, condition, or activity will be limited by his ability to understand and interpret it and by the extent to which it is satisfying to him. It has already been suggested that interests are learned. They grow out of experiences conducive to the satisfaction of the child's needs. Such experiences should be meaningful, significant, and successful. One cannot be interested in a situation that is completely meaningless, except as it might suggest something that is meaningful. This does not mean that the complete operation of all elements of the situation must be understood. A ten-year-old girl may not understand everything about the play life of Navaho Indian children, but display a rather keen interest in this as a result of a trip through Arizona and Utah. There were aspects of their life which interested her, which tended to arouse her curiosity about other aspects of Navaho culture.

Children of the same age and general background will not display identical interests. The child who is able to sing and keep time with music at an early age will in all probability show considerably more interest in music than will the child with less musical ability. The child who can catch balls and bat balls well will be more anxious to take part in activities involving these skills than will the boy lacking athletic ability. Thus, the interests of a particular child are likely to be closely related to activities which he can perform successfully.

Interests in play. Play tendencies may be observed among children very early in life. This is a normal activity for the healthy child. It appears spontaneously when the healthy child is well fed, rested, and uninhibited in his activities. In one sense play may be thought of as a mental attitude taken toward an activity. When the activity is performed primarily for joy or pleasure it takes on the characteristic or nature of play. The idea of learning to play is somewhat erroneous, rather we learn how to play certain games.

Although there are important changes of play interests with age, there is no single age at which there is an abrupt change in the nature of interests. Early studies by Lehman and Witty revealed that the changes of play interests that characterize a given age appears to be gradual in nature, in harmony with other growth changes taking place.[1] For example, five-year-olds like to play with blocks; however, this interest is not suddenly dropped when the child turns six and enters the first grade at school. This is shown in a study reported by Jones, in which the *University of California Interest*

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[1] H. C. Lehman and P. A. Witty, "Periodicity and Play Behavior," *Journal of Educational Psychology*, Vol. 18 (1927), pp. 115-118.

Record was administered to a group of boys beginning with the sixth grade.[2] A group of activities in which there was a pronounced decline in interest is shown in Figure 8-1. These curves show that beginning with the sixth or seventh grade there is a rapid decline in such interests as playing marbles, magician's outfit, collecting stamps, and the like. While there is a decline in some interests there are certain interests developing which reach their peak during the adolescent years.

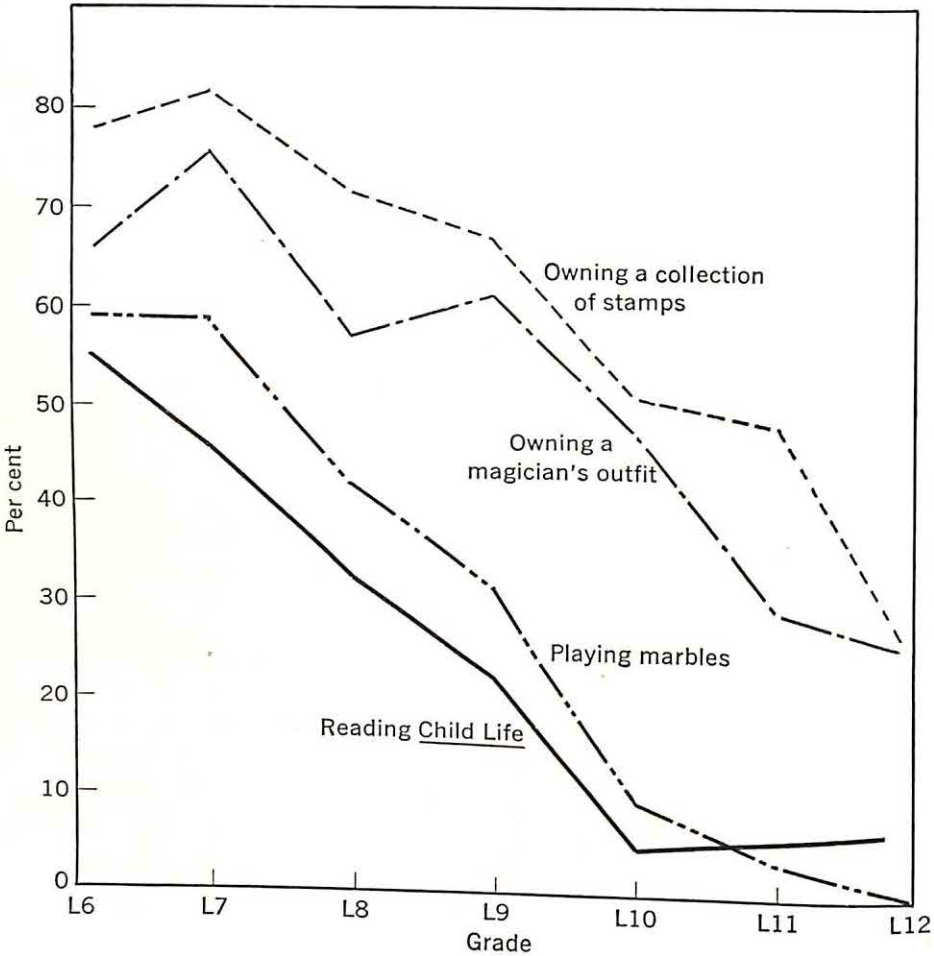

FIGURE 8-1. Changes of four childhood interests with change of grade status

Cultural and economic environmental factors affect the play life of children. Two public schools of strongly contrasting environments were used by Woody in a study of the interests of children in different play activities.[3] The personal interview method was used in determining the games preferred by children from grades one through six. The games mentioned by the children were classified into five groups: (1) singing games, (2) traditional games, (3) newer games, (4) adult sports, and (5) card and table games. The percentage of children from the two school environments participating in each of these types of games is presented in Table 8-1.

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[2] Harold E. Jones, *Development in Adolescence* (New York: Appleton-Century-Crofts, 1948), p. 104.

The similarities in the play activities of the children from the two environments were greater than the differences. This may be accounted for in a large measure through similarity in habits and customs and the widespread means of communication found in our culture. The predominance of the traditional forms of play behavior in the lower grades suggests that the school programs are quite similar in the two environments. The prevalence of singing games in play shows the appeal of rhythmic experience at this age level. The traditional games are the oldest and most classic example of the influence of adult culture upon growing children; while the newer games reveal the influence of the contemporary civilization and the school program. The kinship of adult culture with the games of preadolescent and adolescent boys and girls is usually very clear. This may be noticed in the case of the major sports of college and adult life. These are engaged in by elementary-school and high-school boys in all parts of the United States. The card and table games reflect the influence of smaller select groups of adults and are engaged in most frequently by children from the privileged environment.

The contrasting environments of the schools suggest an economic basis for certain cultural patterns of play. The children from School B (restricted environment) were called upon to help with more household duties. They favored the traditional games. The higher economic level of the children in School A gave them the means and opportunity to mingle together more in co-operative endeavors. They also displayed more interest in adult forms of recreation very early in life.

Reading interests. The reading interests of kindergarten and elementary-school children tend to follow a more or less definite pattern. These children like stories that are short and profusely illustrated about animals, fairies, and other children. There is a gradual change from fantasy to fact, although the boys at all age levels show less interest in fairy stories than girls. At an early age they delight in Indian and cow-boy adventures. Mark Twain's

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[3] Grace Woody, "Similarities and Differences in the Play Activities of Children in Two Public Schools with Contrasting Environment," *Journal of Experimental Education*, Vol. 7 (1938), pp. 145-157.

TABLE 8-1. *Comparison of play interests of children in two public schools with contrasting environments*

		TYPES OF GAMES				
GRADES	SCHOOLS	SINGING GAMES	TRADITIONAL GAMES	NEWER GAMES	ADULT GAMES	CARD-TABLE GAMES
1	A	16	38	25	14	7
	B	34	37	21	5	3
2	A	8	39	20	23	10
	B	23	28	32	16	1
3	A	12	34	16	32	6
	B	17	40	26	16	1
4	A	2	40	29	27	2
	B	14	49	24	12	1
5	A	2	41	39	20	8
	B	3	48	14	33	2
6	A	1	18	21	47	13
	B	1	43	12	44	0

Tom Sawyer and the Tarzan books rate high with preadolescent boys; while *Little Women* and other books dealing with home and school life are popular with girls at this time. However, many girls display an interest in stories of adventure. Witty, Comer and McBean studied the books preferred by elementary-school children.[4] The titles most commonly listed by kindergarten children and children in the first three grades show a fairly close relation to standard book lists for the grade levels concerned. *Bambi, Little Black Sambo,* and *Make Way for Ducklings* were titles most frequently listed by elementary-school children.

In the study by Witty, Comer, and McBean, 7,879 children from grades four through eight were asked to list the five books they had read and enjoyed during the past year. The titles most commonly listed are given in Tables 8-2 and 8-3. It is significant that no books of poetry are found among the books most frequently listed by these elementary-grade children. This perhaps results from the way poetry is usually treated in the school program. If poetry were selected because of its appropriateness, and children were given greater freedom in interpreting it and in their own creative work they would find their learning experiences more satisfying and more effective in developing interests in and appreciation for poetry.

The enormous interest of children in comic books has alarmed some educators while it has presented a challenge to others. Reading the comics

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[4] Paul Witty, Ann Comer, and Dilla McBean, "Children's Choices of Favorite Books: A Study Conducted in Ten Elementary Schools," *Journal of Educational Psychology*, Vol. 37 (1946), pp. 266-278.

TABLE 8-2. *Book favorites of the intermediate grades (IV-VI)*

AUTHOR	TITLE	RANK
Knight	Lassie Come Home	1.0
Atwater	Mr. Pepper's Penguins	2.0
Sewell	Black Beauty	3.0
Clemens	Adventures of Tom Sawyer	4.0
	Fairy Stories (no edition given)	5.0
Rains	Lazy Liza Lizard	6.0
McClosky	Homer Price	7.0
Grimm	Fairy Tales	8.0
Estes	The Moffat Books	9.0
Brooks	Freddy the Detective	10.0
Geisel	The Five Hundred Hats of Bartholomew Cubbins	11.5
O'Brien	Silver Chief	11.5
Lofting	Dr. Dolittle Books	13.0
	Arabian Knights Entertainment	14.0
Spyri	Heidi	15.0

is the favorite pursuit for a large percentage of children at each grade level. In one study of this problem 1,272 elementary-school children from metropolitan Chicago were interviewed.[5] The average number of comics read regularly by the children in the middle grades was about five. At this time, the number of comic strips read regularly was fourteen for elementary-

TABLE 8-3. *Book favorites—upper grades (VII-VIII)*

AUTHOR	TITLE	RANK
Knight	Lassie Come Home	1.0
Estes	Moffat Books	2.0
Boylston	Sue Barton Books	3.0
Tunis	Keystone Kids	4.0
O'Brien	Silver Chief	5.0
Terhune	Lad	6.0
Tunis	All American	7.0
Brink	Caddie Woodlawn	8.0
Sperry	Call it Courage	9.0
Stevenson	Treasure Island	10.0
Sewell	Black Beauty	11.0
Tunis	Kid from Tomkinsville	12.0
Forbes	Johnny Tremin	13.0
Clemens	Adventures of Tom Sawyer	14.5
Seredy	The Good Master	14.5
Beals	Davy Crockett	17.0
Sture-Vasa	My Friend	17.0
Tunis	Champion's Choice	17.0

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[5] Paul Witty, "Children's Interest in Comics, Radio, Motion Picture and TV," *Educational Administration and Supervision,* Vol. 38 (1952), pp. 138-147.

school pupils. The interest in comics continues through the high school, although at this stage much of the interest is in comic strips.

Interests in radio and television. Studies of the types of radio programs preferred by children show that they follow rather closely their interests in reading. At two years of age the child dances and follows a simple rhythm to the sound of the radio or phonograph. He is attracted to the activities of puppets and children on the television. The interests in particular programs develop rapidly after the age of five, so that by the age of seven and eight they dislike missing their favorite program. A study of the interests of boys and girls from grades five, eight, ten, and twelve by Brown showed that mystery plays were liked by a large percentage of pupils at the different grade levels, with the possible exception of twelfth-grade girls.[6] These results are shown in Table 8-4. The radio and television interests of children will vary considerably, depending upon such factors as opportunities for seeing and listening to different programs, other interests of the individuals concerned, and special needs. In general, there is a decline of interest in radio programs as children reach adolescence and extend their range of interests. However, the importance of radio and television interests of children has not been fully taken into account in our educational programs. Many modern schools are reorganizing their programs and facilities so as

TABLE 8-4. *Types of radio programs liked best by boys and girls of different grade levels by per cent choosing each type*

TYPE OF PROGRAM	FIFTH GRADE		EIGHTH GRADE		TENTH GRADE		TWELFTH GRADE	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
	%	%	%	%	%	%	%	%
Mystery plays	94.0	97.1	94.3	95.1	84.9	76.0	66.7	39.4
Comic dialogues and skits	86.4	96.2	92.0	98.5	87.9	93.0	76.8	78.3
Dramatic plays	88.0	90.0	82.8	84.7	67.1	86.2	55.0	89.8
Popular dance music	47.3	70.2	63.4	81.3	83.5	95.2	94.2	98.7
Popular song hits	45.1	53.6	52.4	60.2	78.1	81.3	70.5	82.4
Semiclassical music: orchestra and band	44.4	60.0	78.3	81.4	60.8	57.2	17.2	32.4
News, including sports	12.3	46.4	47.5	31.3	55.3	52.6	54.8	26.1
Political speeches	6.6	2.0	46.4	19.6	51.2	33.0	45.2	18.0
Classical music, including opera	5.7	10.2	16.4	25.0	12.3	23.1	10.8	20.2
Educational talks	1.4	3.6	11.5	8.1	22.0	12.2	13.4	13.4

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[6] Francis J. Brown, *The Sociology of Childhood* (Copyright, 1939, by Prentice-Hall, Inc., New York), p. 328. Reprinted by permission of the publishers.

Portland (Oregon) Public Schools

The modern school makes use of audiovisual aids for stimulating learning and development

to take advantage of radio and television programs which supplement and make more meaningful many of the learning experiences encountered at school.

A cross-sectional survey of high-school students' interest in TV showed that in homes where there are TV sets the students spent an average of almost three hours daily observing their favorite programs.[7] These pupils reported that they spent much more time televiewing than listening to the radio and that they attended movies less often than they did before securing the TV. The possibilities of television as an educational medium are extremely great because of its appeal to the interests of both young people and adults. It gives promise of furthering the education of the 10,000,000 adults in the United States who have less than a fifth-grade education. The Federal Communications Commission through assigning 242 communities television channels for noncommercial education has opened undreamed opportunities for education.

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[7] Paul Witty, *op. cit.*

ATTITUDES

The nature of attitudes. Certain students of psychology have emphasized the importance of the psychological environment rather than the objective environment in the determination of behavior. It is in this connection that attitudes play an important role. Attitudes are broader in scope than interests. We speak of one's attitude toward racial or religious groups, or toward fundamental social and economic issues such as public health, price controls, and reciprocal trade agreements. Although attitudes are more passive in nature than interests, they are important in determining one's action in connection with various situations with which he might be confronted. Thus, attitudes have been referred to by some as inclinations, prejudices, or preconceived notions and feelings towards things, persons, situations, and issues.[8]

A concept presented by Newcomb appears to present a functional definition for attitude, and is used as a basis for much of the discussion presented in this chapter.

> An attitude is not a response but a more or less persistent set to respond in a given way to an object or situation. The concept of attitude relates the individual to any aspect of his environment which has positive or negative value for him.[9]

Attitudes are related to various conditions and situations with which one is acquainted. We speak of our attitude toward China, communism, public education, Sunday worship, college football, and the like. Since these attitudes are manifested toward particular things, situations, or conditions they are often quite inconsistent; however, as the personality becomes better organized, these attitudes tend to become more consistent.

Attitudes are often highly tinged with emotions, and may be displayed in emotional as well as in rational behavior. A child's ability to be tolerant and unprejudiced will depend upon his emotional characteristics as well as upon his understanding the particular situation or issue. Studies of attitudes do not attempt to separate the emotional factors from the rational, since these too are clearly interwoven. Teachers should attempt to guide the pupils in the development and modification of attitudes through a careful appraisal of the information available rather than through emotional responses.

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[8] L. L. Thurstone, "Attitudes: I. Their Nature and Development," *Journal of General Psychology*, Vol. 21 (1939), pp. 367-399.

[9] T. M. Newcomb, "Studying Social Behavior," in *Methods of Psychology*, T. G. Andrews, ed. (New York: John Wiley and Sons, 1948).

Attitude formation. There is good evidence based on observations of children during their first year of life that attitudes develop very early.[10] Children show definite preferences for toys and special forms of treatment by the age of six to eight months. As early as 24 months boys have been observed to prefer airplanes, guns, soldiers, and various mechanical toys, whereas girls choose dolls. The source of these attitudes lies primarily in the culture of the home. Attitudes toward father, mother, brother, and sister are learned through the behavior patterns encountered in the home environment. Newcomb observed that the influence of the parents stems to a large extent from the institutional allegiances which they foster in their children.[11]

The socio-economic status and cultural level of the home have a tremendous influence upon the child's attitudes. This was noted in a study by Dolger and Ginandes of the attitudes toward discipline exhibited by children representing different socio-economic and cultural groups.[12] Children were selected from two schools in New York City which differed widely in their educational philosophy and in the socio-economic and cultural status of the pupils. The attitudes of the children toward what action should be taken in dealing with Jimmy, a problem child six years of age, were studied. The children were also interviewed about what disciplinary measures should be used in connection with ten situations involving problem behavior.

Important differences in the attitudes of these two groups of children toward desirable disciplinary measures for specific types of behavior problems were noted. The children from the low socio-economic background were more inclined to hold the individual child responsible for the misbehavior and they were more concerned with his punishment than were the children from the high socio-economic and cultural background. The latter group of children seemed to comprehend an environmental basis for such conduct. The low socio-cultural status group expressed the opinion that a truant officer should see that the child who played "hookey" from school is punished; while the other group of children were inclined to account for the misconduct on the basis of an unhappy home or school life or some

[10] Gardner Murphy, L. B. Murphey, and T. M. Newcomb, *Experimental Social Psychology* (New York: Harpers), 1937.

[11] T. Newcomb, "Determinants of Opinion," *Public Opinion Quarterly,* Vol. 1 (1937), No. 4, pp. 71-78.

[12] Laura Dolger and Janet Ginandes, "Children's Attitude toward Discipline as Related to Socioeconomic Status," *Journal of Experimental Education,* Vol. 15 (1946-47), pp. 161-165.

other factor largely beyond the control of the individual child. The children from the low socio-economic group frequently referred to reform schools, truant officers, and correction homes in the more serious offenses. The children from the high socio-economic levels did not reveal familiarity with these guardians of the law. These differences in the attitudes should have an important bearing on the nature of guidance given these children. The child from the inferior background is often surprised that he is not going to be severely punished when he has committed some offense, since punishment is what he has ordinarily experienced or observed in connection with such acts in his cultural environment. Thus, praise and encouragement have often been found most effective for those children.

The experiment by Coffin shows the influence of suggestion in the formation of attitudes.[13] In one case Coffin studied the relationship between an individual's attitude and the type of propaganda with which he was confronted. Two principal relationships were observed in the results of his studies. In the first place, it was noted that individuals accept those suggestions which harmonize with pre-existing attitudes, even when alternative suggestions are available. It has been observed by other investigators that suggestions are readily accepted when they fit into one's general "frame of reference," or "set of attitudes."

The second principle derived from this study relates to the *situational factors* in the process of suggestion. Suggestions are more readily accepted when the situation partakes of ambiguity or difficulty for the individual concerned. In other words, an individual yields to suggestions in problems that are well-nigh meaningless to him better than with those he understands. This principle is most important in the formation of attitudes among uninformed and immature subjects. It points up the need for helping the individual to *understand* the problem.

Change of attitudes with age. Specific racial attitudes, characteristic of those found in the child's environmental background, appear among children by the time they enter school.[14] It is important for teachers to realize the nature and basis for these attitudes in order to be able to guide the child in the development of favorable attitudes. As the child grows older his capacity for making discriminations increases, and attitudes are changed in harmony with his varied experiences.

Individuals of the same age level but differing in physiological development will display differences in attitudes. This was borne out in the study by Stone and Barker of 1,000 girls from two large junior-high schools of Berkeley, California.[15] These girls were matched for chronological age and social status but were significantly different in their physiological development. Comparisons were then made of the attitudes and social development of girls differing in their physiological development. The girls who were more advanced in their physiological development favored more mature interests and attitudes than those favored by the less mature girls. Furthermore the more mature girls displayed a greater interest in members of the opposite sex and less interest in participating in sports. The greater interest in adornment, desire for independence, and in boys characterized those girls who had reached the stage of adolescence. These differences in interests found among girls and boys in the junior-high school presents a difficult problem for those concerned with the social, recreational, and health guidance of these boys and girls.

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[13] T. E. Coffin, "Some Conditions of Suggestion and Suggestibility: A Study of Some Attitudinal and Situational Factors Influencing the Process of Suggestion," *Psychology Monographs* (1941), No. 241.

[14] See Helen G. Trager and Marian J. Radke, "Early Childhood Airs Its Views," *Educational Leadership,* Vol. 5 (1947), pp. 16-23.

To assess the present understanding of their future role as parents a national sample of 15,000 high-school pupils was given the *Stedman-Remmers Scale of Attitudes toward Child Behavior*.[16] A careful study of the results of this sample showed that girls in high school are superior to boys in their knowledge and attitudes toward child behavior. This is no doubt closely related to their greater interest and more direct experience in child management, and more relevant reading in curricular materials bearing on related problems. The eleventh- and twelfth-grade boys and girls gave better responses than did the ninth- and tenth-graders, irrespective of the educational level of their parents or the social and cultural status of their home background. This would seem to indicate that the high-school program is effective in building favorable attitudes toward child management. If the high school is to fulfill this task most effectively, objectives, materials, and methods should be directed toward this as a goal.

As children develop they become less susceptible to suggestion and display a greater independence of group opinion. A study of this problem by Marple showed that high-school students, college students, and adults, in the order mentioned showed a decline in influence of majority opinion.[17] The teacher of elementary-school children and junior-high school pupils is able to exert more influence on the development of attitudes than is the case for the teacher of high-school or college students.

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[15] Calvin P. Stone and Rogers C. Barker, "The Attitudes and Interests of Premenarcheal and Postmenarcheal Girls," *Journal of Genetic Psychology*, Vol. 54 (1939), pp. 27-72.

[16] H. H. Remmers and A. J. Drucker, "Teen-agers Attitudes toward Problems of Child Management," *Journal of Educational Psychology*, Vol. 42 (1951), pp. 105-113.

[17] Clare H. Marple, "The Comparative Suggestibility of Three Age Levels to the Suggestion of Group vs Expert Opinion," *Journal of Social Psychology*, Vol. 4 (1933), pp. 176-186.

The influence of the schools. The influences exerted by the schools in the development of attitudes is usually of an indirect nature. The teacher who is fair in his dealings with the pupils will exert an important influence in the development of attitudes of fairness among the pupils. The contagious nature of the development of attitudes has been observed by a number of students of psychology. Attitudes are taught by teachers in three ways: (1) through their own attitudes and behavior; (2) through a planned program of instruction; and (3) as by-products of the total school program. The teacher with prestige among his pupils exerts a strong influence on their attitudes. Thus, his stand on a particular issue weighs heavily with the pupils. In general, teachers have been reluctant to take a strong position on a controversial issue, since their position with the public is likely to become involved. Prestige also comes through books, movies, and other sources of instruction at school. It has been shown that movies may exert a strong influence on children's attitudes. Thus, the amount of information about an issue possessed by a child is not always an accurate gauge about his attitudes on the issue.[18] The source of the information and the manner in which it was presented are important factors.

A study by Epstein with high-school juniors and seniors as subjects showed that social and political attitudes could be changed as a result of experiences with particular social and political problems.[19] The students were given a social- and political-attitudes questionnaire consisting of forty-five questions. The senior class was then taken on an extensive field trip, visiting certain government projects and other enterprises. The junior class was not taken on the trip. Following an interval of three weeks after the first attitude questionnaire was administered both the junior and senior class were given the questionnaire a second time. Pronounced changes were observed in the social and political attitudes of the seniors, although no significant changes were noted for the junior class. This study indicates that meaningful experiences may produce important changes in the attitudes of high-school students. An educational program that makes use of community resources and related materials will have the most influence on the attitudes of the pupils.

There is evidence from many studies of an increased liberalization of attitudes with progress in schooling. In a study by Corey 100 girls completed attitude scales in six areas as freshmen and a second form of the scales one year later.[20] The results revealed significant changes in a more liberal attitude toward most of the areas tested. In a similar study Farnsworth [21] found a slight trend toward pacifism with increased education; while Garrison and Burch [22] noted a consistent trend among white college students in a more favorable attitude toward the Negro with advanced educational level.

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[18] See R. C. Preston, *Children's Reactions to a Contemporary War Situation.* Child Development Monographs, No. 28 (Teachers College, Columbia University, 1942).

[19] Leon J. Epstein, "Attitudinal Changes Attendant upon Variations in Experience," *Journal of Educational Research,* Vol. 34 (1941), pp. 453-457.

VALUES AND IDEALS

Meaning and importance. The adjustive process is ever present in human behavior. The individual behaves in a way which he believes will satisfy his needs and ends. These needs or ends may be said to be his life goals. They are all-inclusive, but are not always clearly defined. Neither are they carefully considered each time a choice or decision is to be made, although they are always there, and are important in determining the choices. Thus, ideals and values differ from attitudes in their ever-present, imperative nature. It was suggested earlier that the individual has an indefinite number of attitudes and these are often most inconsistent. Ideals are fewer in number—being broad guiding principles of behavior. Since they are broad guiding principles they tend to give stability and direction to one's life.

Any attempt to completely separate attitudes, values, and ideals would be misleading. Values refer to the basis of the choices we make. They refer to what we regard as important rather than what we know. They are best illustrated by a brief description of the personality theory of Edward Spranger, a distinguished German educational philosopher. The six main personality types presented by Spranger has been the basis for many fairly recent studies bearing on this problem.[23] These six types are: (1) the *theoretical*, or the individual who regards theories and knowledge the all-important thing; (2) the *esthetic*—one who places a high premium on beauty and loveliness; (3) the *economic*—one who cherishes things because of their material or economic value; (4) the *social*—one who places considerable importance upon the social factors; (5) the *political*—the person who has a strong desire for power and control; and (6) the *religious*—

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[20] Stephen M. Corey, "Changes in the Opinions of Female Students after One Year at a University," *Journal of Social Psychology*, Vol. 11 (1940), pp. 341-351.

[21] P. P. Farnsworth, "Changes in Attitude toward War During the College Years," *Journal of Social Psychology*, Vol. 8 (1937), pp. 274-279.

[22] K. C. Garrison and Viola Burch, "A Study of Racial Attitudes of College Students," *Journal of Social Psychology*, Vol. 4 (1934), pp. 230-235.

[23] E. Spranger's *Lebensformen* has been translated into English under the title, *Types of Men*. (Halle, Germany, Niemeyer, 1928.)

the person who finds satisfaction and joy in his relationships with the whole of life's experiences and purposes. These values have been incorporated in a measurable test by Allport and Vernon, and considerable research has evolved from these and other attempts to measure individual's choices.

It has already been suggested that no clear-cut distinction has ordinarily been drawn by educational psychologists between values and ideals. A distinction commonly made is that of regarding values as broad categories which tend to give direction and purpose to action. For example, one finds an individual reacting to a specific task or situation in terms of values such as those suggested by Spranger. Ideals, on the other hand, have been looked upon as generalized attitudes. At a fairly early age the child develops ideals of fair play, or love, beauty, and reverence toward specific situations. Ideals of loyalty, justice, and fair play become unified and are sufficiently pervasive to function in varied situations in life.

Values and ideals are especially important in relation to child dynamics. An understanding of the personal values of an individual is most helpful in understanding his personality. Gardner Murphy stresses this when he states:

> Throughout the study of motives and the learning process we have been finding not only that individuals want different things, but that they set up complex systems of wants which are relatively enduring and are maintained even in the absence of external reminders; they carry around within themselves personal systems of values. Personality is in a large measure this personal value system; hence the latter calls for closer study.[24]

Developmental sequence in values and ideals. The values of the infant are physical and concerned with his bodily comfort. As a result of his experiences with people who care for his physical needs his values expand at an early age to include smiles and approval. There is a developmental sequence from these early infant responses to those who care for his physical needs to the formation of wants, wishes, and ideals. The nature and formation of value patterns of preschool children has been studied by Braithwaite.[25] A total of 243 observations of the real-life experiences of four children, varying in length from five minutes to three hours, was made over a nine-months period. Rather complete social and developmental history, along with other data, were available on each child. The findings revealed that value-meanings at both the concrete and abstract levels have already begun to emerge in the personality structure at the three-, four-, or five-year age level. They are characterized at this stage by fluidity and flexibility, and are going through a process of rapid structuring and restructuring. However, some structures show considerable stability at this early age. This may be observed in connection with the values the kindergarten child places on acts of kindness. Values at this stage are likely to be specific in nature, revolving around such persons as the father, mother, aunt, teacher, or Santa Claus.

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[24] Gardner Murphy, *Personality: A Biosocial Approach to Origins and Structure* (New York: Harper and Bros., 1947), p. 270.

[25] Royden C. Braithwaite, "A Study of The Values of Preschool Children." Ph.D. Thesis (Cornell University, 1950).

A personal values inventory was developed by Hawkes to study elementary-school pupils.[26] The inventory covered ten values: beauty, comfort and relaxation, excitement and relaxation, family life, friendships, personal improvement, physical freedom, power and control, privacy, and recognition. The most significant findings in this study was the rank order patterns for the sexes and the total group of 307 pupils. These are presented in Table 8-5. An examination of the data shows that friendship, excitement, and recreation, family life, personal improvement, and comfort and relaxation rank first, second, third, fourth, and fifth respectively. Beauty and privacy rank higher for girls than for boys; while physical freedom and power and control ranked highest for the boys.

TABLE 8-5. *Rank order values patterns for both sexes and for the total group*

RANK	BOYS	GIRLS	TOTAL GROUP
1.	Friendship	Friendship	Friendship
2.	Excitement and Recreation	Excitement and Recreation	Excitement and Recreation
3.	Family Life	Family Life	Family Life
4.	Personal Improvement	Personal Improvement	Personal Improvement
5.	Comfort and Relaxation	Comfort and Relaxation	Comfort and Relaxation
6.	Physical Freedom	Beauty	Beauty
7.	Beauty	Privacy	Privacy
8.	Privacy	Physical Freedom	Physical Freedom
9.	Power and Control	Recognition	Recognition
10.	Recognition	Power and Control	Power and Control

A comparison of the value patterns of the fourth- and sixth-grade groups showed some interesting developmental changes in harmony with educational growth and maturation. The older group valued family life and personal improvement more highly; while the younger group scored higher on power and control and recognition. These findings suggest that growth in values tends to shift from those related to the individual self toward greater social awareness. It is difficult to say just how much the school is responsible for these changes, although it seems most likely that different school programs would bring about different results. For example, schools that emphasize health and cleanliness both by precept and examples will tend to instill these values in the lives of their pupils.

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[26] Glenn Rogers Hawkes, "A Study of the Personal Values of Elementary School Children." Ph.D. Thesis (Cornell University, 1950).

Values and ideals are manifested in the identifications of wishes of children. When seven- and eight-year-olds were asked by Winkler whom they would prefer to be like, more than one-half of them named someone in their family.[27] The results from this question and a parallel question of whom they would prefer most not to be like are presented in Table 8-6. The eleven- and twelve-year-olds expressed a preference to be like someone who plays an important role in our society, such as a movie star, a prominent national figure, or an athlete. The negative identifications followed a somewhat similar course. The fifteen- and sixteen-year-olds displayed in their responses a "hero complex." This has been explained as characteristic of adolescents to identify themselves with certain heroes, who have become their ideals. In this connection sex differences may be noted and among the preadolescents also. Boys more often express as their ideal someone who

TABLE 8-6. *Age differences in the types of identifications on the wishes and fears inventory*

AGE DIFFERENCES	TYPE I *General Roles*	TYPE II *Well-Known Person*	TYPE III *Family*	TYPE IV *Personally Known*	TYPE V *Self*
Positive Identifications					
7 and 8	33.3	12.1	51.5	3.0	0
11 and 12	50.0	27.5	20.0	2.5	0
15 and 16	15.6	43.8	12.5	18.8	9.4
Negative Identifications					
7 and 8	31.6	0	10.5	57.9	. . .
11 and 12	61.5	30.8	0	7.7	. . .
15 and 16	56.3	31.3	0	12.5	. . .

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[27] James B. Winkler, "Age Trends and Sex Differences in the Wishes, Identifications, Activities and Fears of Children," *Child Development*, Vol. 20 (1949), pp. 191-200.

has become a national figure in our society, while the girls show more interest in people whom they know and in social values.

Moral and spiritual values. Morals are individual guides to conduct; while spiritual values give meaning to life. Great religions throughout the ages have upheld and tried to promote certain moral and spiritual values. It was this that inspired the early Puritans to develop schools. Moral and spiritual values are learned in the same manner as other learnings—through experience. However, the nature of the values a child acquires must not be left to chance. The individual pupil has many needs in common with lower forms of life. In addition, he has insights, aspirations, and possibilities for learning and developing that are distinctly human. Because of this he is capable through experience of acquiring habits of initiative and responsibility in his own behavior. This gives him a measure of self-control not to be found among lower forms of life. Ideals of honesty, fair play, and consideration for the feelings of others are acquired through experiences with others in situations where such ideals are guiding forces. The importance of parents, teachers, and peers in the formation of ideals and the development of spiritual values has been shown through countless studies of the growth and development of boys and girls. The place of the school in the development of spiritual values has been emphasized by many prominent educators during the past several years.

It is recognized that we live not only in a world of science but also a world of values. These values, though personal and subjective, are always real. Love and hate may be personal but no one would deny their reality. Scientific knowledge must be accompanied by commensurate spiritual values, if we are to have a harmonious society. This was well stated by Eugene Holman, President of Standard Oil Company of New Jersey, as follows: "The longer I live, the more convinced I am that material progress is not only valueless without spiritual progress, it is, in the long term, impossible." [28]

The importance of values in character formation has been emphasized by a number of investigators. Leckley has postulated that after values are integrated in the personality they act as barriers to the acceptance of new ones which might be in opposition to them.[29] This is necessary if the personality is to remain consistent and somewhat stable. Four prevailing sets of conditions are set forth by Leckley: (1) new values which are in opposition to those already accepted by the individual may be rejected; (2) new values may be so modified that they are no longer in opposition to the accepted values; (3) new values which are in opposition to the old values may be ignored and thus not incorporated into the value system; and (4) old values may be modified in such a way that the new values are incorporated in the total value-system. Bills has offered evidence from a study of students in child psychology classes which supports the viewpoint of Leckley.[30] Using two matched groups of 51 students each, he noted that agreement or disagreement between the students' and instructors' values influenced class marks, even when such marks were based upon objective examinations. He concludes that the learning of the student is influenced favorably by a reasonable amount of agreement between his values and those of the instructor.

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[28] Eugene Holman, "Our Inexhaustible Resources," *Atlantic Monthly* (June, 1952).

[29] P. Leckley, *Self-consistency* (New York: The Island Press, 1945).

Influences of cultural forces. That cultural factors vary with different groups is evident and has been substantiated by many studies. This was pointed out earlier in this chapter in connection with the formation of attitudes. The relationship between value patterns of college students and economic status, social status, level of education, and size of home town was shown in a study by Asabel Woodruff.[31] Groups of individuals with similar social-economic backgrounds engaged in similar educational or vocational pursuits tend to have similar value patterns.

The wide variations in value found among school children present one of the most difficult problems facing teachers and others concerned with the educational process. Allison Davis has described some of the differences in living practices and habits found among the different social-class groups in a typical American community. He summarizes the problem:

> The most basic differences in habit formation between adjacent social classes are those between *lower class* and *lower middle* class. The patterns of behavior in these two groups, in either the white or the Negro population, are so widely different that it is the common practice, even of sociologists, to speak from their middle-class point of view of the lower class as "unsocialized." The social expectations and available goal responses of lower-class and lower-middle-class people are separated by a virtual chasm which is maintained by taboos upon participation across class lines.
>
> The chasm is a behavioral one. It lies between the stimuli and goals of the "respectable," status-bound lower middle-class and those of the recalcitrant, impulsive, and physically aggressive lower class. The ineffectiveness of the usual middle-class stimuli upon lower-class people and the resultant waste of potential social and economic energy in the lower class are the perpetual

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[30] Robert E. Bills, "The Effect of Value on Learning," *Journal of Personality*, Vol. 21 (1952), pp. 217-222.

[31] Asabel D. Woodruff, "A Study of the Directive Factors in Individual Behavior," Ph.D. Thesis (University of Chicago, 1941).

concern of middle-class and upper-class legislators, social workers, and educators.[32]

Education and values. Education has been defined as "a program of social action toward goals that are based on a scale of values." It has furthermore been suggested that the first requirement of a good school is that its program be based upon values that are good. A second requirement is that education should promote worthwhile values. Teachers and school administrators should be cognizant of the importance of value-systems and the role of education in their development and direction. They should be aware of the values fostered by different phases of the school program, their importance in relation to motivation, and the developmental process whereby value-systems are structured and restructured.

Each child brings his past with him to school. Since the school population is made up of children from divergent backgrounds differences in interests, attitudes and values will be found. It has already been suggested that ideals of justice, fair play, love, reverence, and beauty are learned through experience. Certain ideals dealing with man's relation to his fellow man and to the universe have been referred to as spiritual values. Increased attention has been given by educators within recent years to the desirability of emphasizing spiritual values in our schools.[33] The group dynamics found in a democratic school room makes co-operation easier, increases the initiative of the members of the group and leads to worthwhile ideals and values.

A school situation which encourages the development of an understanding of other people and good-will toward them fosters democratic ideals and tolerance. Such a situation requires first of all that the teacher be free of prejudices. Attitudes of prejudices are easily transmitted to children by other children by various procedures which the teacher can control. A second essential in a school situation for the development of an appreciation of and tolerance toward others is that of providing the pupils with a variety of experiences. This leads them to see that there are different ways of doing things. At Christmas time the children may be introduced to different ways of celebrating Christmas, and may be taught some of the Holy occasions celebrated by faiths other than the Christian. These broad experiences introduced in a wholesome manner tend to build respect and appreciation for the beliefs and faiths of others. History, literature, and science may well be used effectively in inculcating understandings, attitudes, appreciations, and ideals. In general the broader our knowledge becomes about a particular thing, the less our prejudices are manifested. Through comparing and contrasting the practices and beliefs of others, we tend to assume a more objective attitude toward our own culture.

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[32] By permission from Davis, Allison, "Child Training and Social Class" in Barker, Roger, *et al. Child Behavior and Development*, p. 636. (Copyright, 1943, McGraw-Hill Book Company, Inc., New York.)

[33] See "Spiritual Values in the Elementary School," *Twenty-sixth Yearbook of the Department of Elementary School Principals, National Education Association* (1947).

A teacher cannot avoid helping pupils develop ideals and values. Not all teachers are equally effective in helping pupils to clarify their own values and formulate other values. In the first place many teachers themselves do not have clearly defined and consistent values. This will most assuredly affect their influence upon the pupils. Certain common misconceptions about the needs of pupils and the nature of the learning process hinder teachers in their efforts. Some of these may be listed as follows:

1. The value-patterns of the children are already fully formed and cannot be changed.
2. It is not the function of the schools to clarify or develop value patterns.
3. Value patterns are constant.
4. Value-patterns are learned through memorizing mottoes, rules, and creeds.
5. A learning situation involving value-patterns will be equally effective for all pupils.

SUMMARY AND GENERALIZATION

The school situation brings boys and girls of the same age level together and provides opportunities for them to grow and develop in harmony with certain attitudes and ideals set forth in the philosophy of the school and the community. These boys and girls come from divergent backgrounds and bring with them to school wide differences in attitudes, interests, and values. This presents a difficult problem for those concerned with education.

The concept that the school should be concerned with verbal learning alone has been replaced with a broader concept in which the school concerns itself with the development of the total personality. Thus, the schools are turning their attention increasingly toward the development of worthwhile interests, attitudes, and ideals. Methods for the development of attitudes and ideals may be classified as (1) incidental, (2) formal, and (3) planned functional. In the first of these there are no planned activities, but the establishment of a favorable environment will insure that favorable attitudes and ideals will be fostered. The second of these depends upon verbal training. Religious programs often resort to this procedure, although it is becoming more generally realized that verbal training alone is insufficient for the development of attitudes, appreciations, and ideals. The planning of activities in the classroom, on the playground, and in the community, that will foster the development of desirable interests, attitudes, and ideals is extremely important, but oftentimes difficult to develop.

Each stage of the child's development is worthwhile in relation to harmonious growth. Any attempt to accelerate the development of certain ideals may be more harmful than good; however, there should be a gradual and continuous formation of useful and worthwhile attitudes and ideals. These cannot be left to chance, neither can they be assigned to some specific period of life. There is good evidence that the social climate of the school is most important for the development of attitudes of co-operation and understanding. A difficult task confronting every classroom teacher is that of respecting the personality of each individual child and at the same time guiding the pupils in the development of desirable interests, attitudes, and ideals.

Questions and Exercises

1. What is the educational significance of the notion presented in this chapter about the role of learning in the formation of interests? How, then, are interests related to motivation?
2. Trace the changes that take place in the play interests of children. Show how cultural forces affect the play interests of children at a given age level.
3. How would you account for the changes in radio and television interests with age? Can you illustrate this change from recent observations of children?
4. How is the child's physiological development related to changes in attitudes? Give examples of changes closely related to physiological changes.
5. How would you account for the differences in attitudes of children from different socio-economic backgrounds toward disciplinary measures?
6. How are attitudes and values related? Consider your own values. What difficulties do you encounter in evaluating them?
7. How are the values of an individual closely related to vocational adjustment and satisfaction?
8. How does the school program contribute to the formation of values? What is the role of the teacher in attitude and value formation?
9. Make a list of attitudes which you think the school program should attempt to promote. How is this related to the question: Should the school indoctrinate?
10. Enumerate several things in this course that have appealed to your interests. Would these interests be classified as *intrinsic* or *extrinsic?*

Recommended Readings

Brown, Francis J., *Educational Sociology* (New York: Prentice-Hall, Inc., 1947), Chap. XX.

Carmichael, L., ed., *Manual of Child Psychology* (New York: John Wiley, 1946).

Crow, Lester D., and Crow, Alice, *Educational Psychology* (New York: American Book Co., 1948), Chap. XIII.

Garrison, Karl C., *Growth and Development* (New York: Longmans, Green and Co., 1952), Chaps. XII and XIII.

Gates, A. I., *et al.*, *Educational Psychology,* 3rd ed. (New York: Ginn and Co., 1948).

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Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), Chap. XIX.

Woody, Grace, "Similarities and Differences in the Play Activities of Children in Two Public Schools with Contrasting Environment," *Journal of Experimental Education,* Vol. 7 (1938), pp. 145-157.

CHAPTER 9

Personality: Its Nature and Development

PERHAPS NO OTHER concept in psychology has been so variously defined, and measured by such a variety of procedures as personality. Its definitions range from mystical verbiage to the detailed descriptions of social acts, and its measurement varies from the interpretation of reactions to ink blots to acquaintance rating graphs. One reason for this variability in definition and measurement is that personality is such a broad and inclusive concept that it is difficult to comprehend all of it at any time, and more difficult yet to measure it in its entirety. Intelligence and ability and memory and appearance and learning and emotion and habits and motivation and attitudes—are all important parts of personality. Personality is the name we apply to the whole of it. It is the synthesis, the totality of all physical and mental attributes. It is the integration of interests, attitudes, capacities, abilities, ideals, aspirations, prejudices, physical qualifications—of a person. It is all those physical and mental attributes which make up a given individual, a person, a John Doe.

THE NATURE OF PERSONALITY

There are three phases or aspects of personality which account for much of the apparent disagreement between psychologists about it. They are really points of view. What is true of one of these aspects may or may not be true of an other. They are like the inside and outside of a cup; aspects of the same thing. First, there is the social aspect, or the stimulus effect a person has on other people, "John has a good personality" means that John has had a favorable effect on some other person. This aspect of personality is the sum total of all those things about a person that affect other people. Acquaintance rating scales are procedures for measuring this aspect of personality. The social aspect of a personality simply means that it affects other people.

Second, there is the reaction or response aspect of personality, or how a person acts and what he does. Some personalities are emotional in reaction while others are calm and "intellectual." Personality is often defined as the sum total of one's reaction patterns. A person who reacts to a wide range of situations with jovial and felicitous behavior is said to have a happy or jovial personality. Some people are said to have aggressive personalities, other "sour-puss" personalities, others dignified personalities, others temperamental personalities—all depending on the way they react or behave in certain situations. Any personality may be studied from the response of behavioral aspect.

A third aspect of personality is the inside, or cause or "why" aspect. It is the psychological nature of the person which causes him to act unsocial, let us say, and thus affect other people unfavorably. People do not like a person (the social aspect) because he is unfriendly (the response aspect) which, in turn, is because he has negativistic attitudes (the cause aspect) developed in childhood. In other words, we may study John Doe's personality from the viewpoint of his friends, or from the viewpoint of what he does, or from the viewpoint of why he acts in whatever way he does. All three aspects are important and yet none of them alone describe the whole of personality. Neither the outside, nor the inside, nor the structure of a cup can be called the cup. The cup is all its aspects. Likewise, John Doe's personality is most certainly how he affects other people; it is unquestionably his behavior or how he acts; it is just as surely his attitudes; his feelings, his "inner state." No aspect definition, nor aspect measurement will give more than an aspect understanding of personality. How we affect other people, how we are affected by things and events in life, and our deepest thoughts, feelings, and attitudes—are all interesting aspects of our personalities. But personality must not be identified with any one of these aspects. It is all of them—and more. It is the whole man, his inherited aptitudes and capacities, his past learnings of all kinds, as well as the integration and synthesis of these factors (aptitudes and learning) into behavior patterns peculiar to and characteristic of that individual.

Some psychologists believe that since personality is a generic term, composed of intelligence, emotion, motivation, learning, memory, thinking, perceiving, and other factors which are given detailed psychological explanation, it would be better to drop the word "personality" entirely. When its components have all been explained, they claim that there is nothing new to be said about personality. This would be true if it concerned inorganic concepts. There, the whole is a sum of its parts. There is nothing new when parts are assembled into a whole. In the organic world, however, the whole is more than a sum of the parts. A synthesis of dynamic parts produces something unique. There are so many cross-relationships involved that very small differences sometimes produce great effects. Dynamic relationships in the organic world cannot be compared with the stress and strain relationships in the inorganic world. However, a synthesis of psychological factors into a personality, living and dynamic, is not a mere assemblage of its composing parts. Personality is something unique, something different from the psychological factors which compose it. It can never be understood from a mere study of its components. It is more than the total of its intelligence, of its emotion, perception, learning, motivation, etc.

This leads us to a primary fact about personality—each is unique, different from every other one. No two personalities are exactly alike, not even those of identical twins. Of course, personalities are similar and can be arranged into rough classifications but exceptions are common. Many personalities do not fit into any classification. They cannot be catalogued. An introvert, for example, sometimes acts like an extrovert, and a submissive personality may at times become a leader. An individual may be emotionally unstable in one situation and remarkably stable in another. A trait degree in one personality does not function in the same way that it does in another. For example, an intellectual level of 118 I.Q. (1 sigma plus, or 84th percentile) may be enough to get one boy through medical school but not enough to get another through high school. Personalities differ in dynamics, and generalizations about them are seldom justified.

A second primary fact about personality is that each is patterned or structured. A personality is not just a conglomeration of unrelated factors. It is composed of attitudes and habits and temperaments and appearances and ambitions and emotions and learnings which are all related in a patterned whole. It is variation in these patterns of intrarelationship that makes personalities unique and different from each other.

A third primary fact about personality is that it is a product of its own functioning. How a personality functions today depends on how it functioned yesterday and determines how it will function tomorrow. Personality is constantly in the process of becoming personality. This fact has profound significance. An extrovert is not born such, nor does he becomes an extrovert by sudden transformation. An extrovert develops by the slow process of acting today in accordance with the way he acted yesterday and then acting tomorrow in the only way he can act because of the way he acted today. This is true of any personality pattern. It is shackled to its own past and yet it is the determiner of its own future.

We have not yet tied personality down to a specific definition. It is difficult to do so. It is too broad and inclusive and variable and unique to be readily defined and it is unwise to simplify it beyond fact justification. It is better to recognize it as a totality which may be considered from three viewpoints—as stimulating other people (or its *social* aspect), as responding to the world about (or its *behavorial* aspect), and as a psychological entity (or its *ontogenetic* aspect.) Personality is all of these. It is the sum total of a person. Three facts are of primary importance—each personality is unique, each is patterned or structured, and each is a product of its own functioning.

With this background in mind, the following pages in this chapter will concern the development of personality, factors which affect the development of personality, and the measurement of personality. Chapter 10 will be concerned with personality adjustments, conflicts, and mental hygiene.

THE DEVELOPMENT OF PERSONALITY

More theoretical writing has been done about personality than about any other topic in psychology. The best known of these theories, and the one on which most others are based, is that of Sigmund Freud.

Freud's theory of personality development. Freud believed that the child has certain basic personality factors which develop as he grows older. If his environment is proper, his personality will mature in a normal manner. If his environment is not conducive to normal development, he may form habits, both mental and physical, which are inconsistent and may conflict with social custom. Such personalities can be psychoanalyzed and restructured. Freud believed that it is fundamental for a person to live in accordance with his innate nature.

There is a basic or instinctive urge (sexual in nature) in all of us which Freud called the *libido* and also a more inclusive pleasure urge which he called the *id*. There also develops in each of us an *ego* or a controller of the id, and a *superego* or conscience. The id is instinctive and subconscious. The ego is both conscious and subconscious and has the power to inhibit or repress the id. This may cause subconscious conflicts which produce tensions in the conscious world. The normal personality develops with few or no subconscious conflicts, while the abnormal personality is affected by its subconscious conflicts.

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Good personality development is promoted through the development of one's abilities

In other words, according to Freud, each person has an instinctive desire for sex and sex-related pleasures as well as a learned desire to curb these instinctive pleasures and satisfy them only in accordance with social customs. It is somewhat analogous to the religious theory of conflict between carnal evil and spiritual good. Freud believed that repressed or subconscious conflicts should be "psychoanalyzed" into conscious realization so as to avoid their manifestation in compensations, rationalizations, obsessions, projections, sublimations, and other bad personality habits. Id and ego conflicts should not be repressed but recognized and resolved. Each personality should be honest with itself and uncover any repressed desires in its subconsciousness.

The methods Freud used for uncovering the subconscious conflicts were dream analysis, error interpretation, and free association, which has been later refined by Rogers into "nondirective technique." Freud believed that dreams, errors, and word associations, often symbolized the nature of repressed desires. The problem is to interpret them properly. He also believed that if a person is relaxed and allows his mind to "wander" it will gravitate to his subconscious conflicts or troubles.

Personality therapy was no problem for Freud. He believed in the cathartic value of analysis. The sick personality has conflicts in his subconsciousness. The healthy personality may have conflicts but he knows about them. He holds no secrets from himself. He may not be able to satisfy his desires but he does not abolish them from conscious recognition. To uncover and recognize a conflict will relieve the tension produced by its existence.

Most other theories of personality development are but modifications of Freud's theory. They recognize that every child in every social group must adjust to conflicts between his personal wants (sex and others) and the customs of his group for satisfying those wants. All individuals must fit the satisfaction of his personal wants to the customs of other individuals with whom he must live. In other words, every individual must be socialized in the process of satisfying his wants.

Personality a result of integrated growth. The contributions of Freud to an understanding of personality development and conflicts are most important. It is generally recognized that there are aspects and depths to the personality of which the conscious self is not wholly aware. All individuals must fit the satisfaction of his personal wants to the customs of other individuals with whom he must live. In other words, every individual must be socialized in the process of satisfying his wants. The importance of this concept may be noted in the expressed needs of the child presented in Chapter 10.

It has been emphasized throughout the previous chapters that the child grows as a unified whole. Samuel Brody states: "An organism is a closely-knit community, the component members of which—nervous, endocrine, circulatory, excretory, digestive, and so on—cooperate in maintaining a dynamic steady state in the face of fluctuating external conditions." [1] The biological structures and predispositions are laid down in the germ plasm. In the process of the interaction of the organism and its environment, certain characteristics and action-traits are developed. The physical vigor and mental health of the adult will depend upon the growth process of childhood and youth as well as on the genetic constitution from which the individual originated. A well-integrated organism may be described as one which through continuous striving has been able to maintain a balance in his behavior pattern that has best satisfied his needs for survival and development. The disorganized or disintegrated organism is one in which this balance has been adversely affected and harmonious reaction patterns no longer exist. It is essential, therefore, for the child to develop as a unified whole, if we are to achieve harmony and stability in his growth. The teacher who would emphasize the educational development of the child without any regard for his health development or social growth will not be able to achieve the goal of a well-unified personality.

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[1] Samuel Brody, "Science and Social Wisdom," *Scientific Monthly*, Vol. 59 (1944), p. 205.

The growth of normal personalities.[2] A normal personality may be defined as one that is adjusted—both to the customs of society in which it exists, and to itself. It has no persistent tensions due to unsolved problems. It is at peace with society and with itself.

Such a personality develops by *being* just what it is trying to *become*. An adjusted personality becomes such by the process of adjusting to living conditions as they arise. A well-adjusted child tends to grow into a well-adjusted adult and a poorly-adjusted child is likely to grow into a poorly-adjusted adult. "What you are to be, you are now becoming." A normal personality is the product of well-adjusted living.

Unfortunately, school-age children are not all well adjusted. Rogers found in a sampling of elementary school children that 12 per cent had serious adjustment problems, 17.5 per cent had moderate adjustment problems, and 70.5 per cent were relatively well adjusted.[3] Paynter and Blanchard found that 45 per cent of a group of Los Angeles children had mental conflicts and 54 per cent of a group of Philadelphia children had inferiority feelings.[4]

Ackerson made a statistical study of the 5,000 children examined at the Illinois Institute for Juvenile Research and found that adjustment problems were more frequent among boys than among girls.[5] The frequencies for both increased up to about the age of twelve years. He divided adjustment problems into (1) personality problems and (2) conduct problems. The frequencies of these two types of adjustment problems are shown in Table 9-1. Boys exceed girls in all classifications of adjustment problems and at all ages up to age 17. This aspect of Ackerson's data is shown in Fig. 9-1 and Fig. 9-2. At age 17, the girls exceed the boys in both personality problems and conduct problems. The reason is, perhaps, that they are physiologically and socially older than boys at this chronological age.

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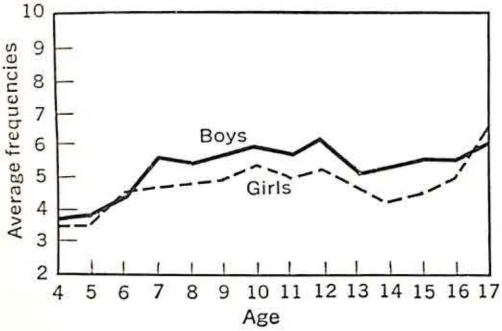
[2] A liberal portion of this section of this chapter has been modified from Chap. 6 of *Psychology Applied to Human Affairs,* by J. Stanley Gray (McGraw-Hill Book Co. Inc., New York. 1954).

[3] C. R. Rogers, "A Study of Mental Health in Three Representative Elementary Schools," *Ohio State University Educational Series Monographs,* Vol. 25 (1941), pp. 130-161.

[4] R. H. Paynter and P. Blanchard, *A Study of Educational Achievement of Problem Children* (New York: The Commonwealth Fund, 1929).

[5] L. Ackerson, *Children's Behavior Problems* (Chicago: University of Chicago Press, 1931).

Hattwick and Stowell found that there is a close relation between home adjustment and school adjustment.[6] Children who are well adjusted at home are usually well adjusted at school. A group of fifth-grade children who were well adjusted at home were compared with a group who were babied at home and with another group who were pushed or nagged at. The adjusted group were approximately three times better adjusted than the other two groups in both social and work habits at school. This was true on both the second- and fifth-grade levels.



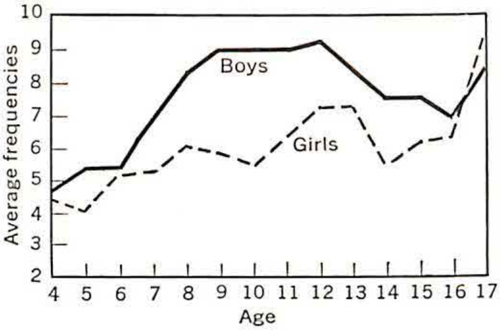


FIGURE 9-1. Frequencies of personality problems at various ages (2,776 boys; 1,675 girls)

FIGURE 9-2. Frequencies of conduct problems at various ages (2,776 boys; 1,675 girls)

TABLE 9-1. *Comparative frequencies of certain behavior problems*

PERSONALITY PROBLEMS	PER CENT	CONDUCT PROBLEMS	PER CENT
Mental conflict	4	Stealing	26
Hyperactive (restless)	23	Lying	24
Inferiority feelings	6	Truancy (from school)	19
Daydreaming	7	Disobedience	17
Egocentric	11	Truancy (from home)	18
Seclusive	10	Fighting	10

CHARACTERISTICS OF NORMAL PERSONALITIES

Normal personalities have effective adjustment habits and so have no unsatisfied wants of long duration which are not being satisfied. There are no persistent maladjustments. Such personalities may be expected to be characterized by certain characteristics or personality traits.

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[6] L. W. Hattwick and M. Stowell, "The Relation of Parent Overattentiveness to Children's Work Habits and Social Adjustment in Kindergarten and the First Six Grades of School," *Journal of Educational Research,* Vol. 30 (1936), pp. 169-176.

Happiness. A happy person is never in bad psychological condition. He may be economically broke, he may have no social standing, he may be physically deformed, he may be ignorant, but if he is happy he is probably in good mental health. As Morgan says, "Happiness is almost as good an indicator of mental health as bodily temperature is of physical health." [7]

Self-honesty. "To thine own self be true." A person who is realistic, who sees things as they are regardless of how they may appear, who distinguishes between what he knows to be true and what he may wish were true, who may put his best foot forward for social reasons but is never dishonest with himself, has already acquired one of the hardest-to-learn characteristics of good mental health. It is so easy to pretend, even to one's self, and so hard to face cold facts. Unpleasant facts must not be repressed from one's own recognition. "Know thyself."

Emotional control. According to Cannon [8], emotion has had a survival value in the past and still has an "emergency" value. Be that as it may, uncontrolled emotion is a psychological handicap to good mental health. It causes an individual with superior intelligence to act like one with inferior intelligence. Foolish adjustments are made when one is emotionally aroused. Fortunate is he whose emotions never rule his intelligence.

This does not mean that controlled emotional tension has no value. In fact, controlled emotion in certain situations increases the effectiveness of behavior. The emotional excitement of a cheering crowd and a tied score at a football game will increase the efforts and precision of well-trained players. Of course the tension of such a situation may cause some players to "go to pieces" but this is probably due to emotion that is out of hand or uncontrolled. Well-controlled emotional tension may even increase mental effort by increasing motivation. Again the emphasis is on control. Uncontrolled emotion probably does little more than increase physical strength.

Enjoyable occupation. The nature of a man's occupation is unimportant as long as it is interesting to him. Years ago John Dewey pointed out the fallacy of "labor and leisure." [9] He argued that if a man is vocationally adjusted and working conditions are as they should be, he will get leisure values out of his labor. Leisure can be use*ful* enjoyment as well as use*less* enjoyment. Certainly enjoyable work is a major characteristic of an adjusted personality.

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[7] J. J. B. Morgan, *How to Keep a Sound Mind* (New York: The Macmillan Co., 1946), p. 7.

[8] W. E. Cannon, *Bodily Changes in Pain, Hunger, Fear, and Rage* (New York: Appleton-Century-Crofts, Inc., 1929).

[9] John Dewey, *Democracy in Education* (New York: The Macmillan Co., 1916).

Teachers and educators too often lose sight of the significance of education in the preparation for making a living. As one writer has said, "Our present educational system is better equipped to give eight years of the wrong kind of education to its pupils than eight hours of competent psychological guidance in the choice of the right type of education." [10] This writer was emphasizing the importance of making education more realistic and more related to life as it is after school years are over. Certainly a well-adjusted personality must be well adjusted vocationally.

Harmonious habits and ideas. It is mentally unhealthy for an individual to be in conflict with other people, but it is worse for him to be in conflict with himself. When a man disagrees with himself he is not well adjusted. The integrated personality has no self-conflicts. It may conflict with social custom, but it does not conflict with itself. A person's own ideas and habits must agree with each other. There must be no post-behavior feelings of guilt because personal principles have been violated. The adjusted personality is first of all adjusted to itself.

Physical health. Personality is not something apart from the body; it is the body in motion. If the body is in poor health, it is almost impossible for it to have normal wants and to satisfy them in a normal manner. Good physical health is almost a prerequisite to good personality.

Some evidence of this close relationship is shown in a study by Laird and his associates.[11] They investigated the effects of only two weeks of special school feeding on a group of nervous children (determined by the Olson Behavior Check List) as compared with a control group of children who received no special feeding. The control group improved but 2.3 per cent in decrease of nervousness while the children receiving plain milk at 9:30 each morning improved 15.6 per cent. The numbers were too few in both groups and the time was too short, but the study does suggest the pattern for more adequate investigation.

Social status. Fundamental to the adjustment of any individual is his adjustment to his companions. It is not enough for him to approve of himself; he must also be approved of by his friends. Social adjustment is a necessity of good mental health. A physical or economic handicap is not so very serious in personality development until it becomes condemned by acquaintances. Even the slightest social stigma attached to a handicap will make adjustment doubly difficult.

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[10] H. C. Link, "Wheat and Chaff in Vocational Guidance," *Occupations* (October, 1934).

[11] D. A. Laird, *et al.*, "Nervousness in School Children as Related to Hunger and Diet," *Medical Journal and Record,* Vol. 134 (1931), pp. 494-499.

This factor functions in the adjustment of nations to each other as well as in the adjustment of individuals to each other. Diplomats sometimes jeopardize world peace to save face or avoid humiliation. Often diplomacy is handicapped by instances of humiliation long past. It is important for human beings in all their relationships to maintain social status.

Perhaps the characteristics of normal personalities can be made more clear by contrasting them with the characteristics that are not normal. Cattell[12] reports the results of a factor analysis study of 171 personality traits. These were found to cluster around 12 primary factors. These are shown in Table 9-2 together with a few components of each. These factors may appear to overlap but a statistical overlapping is due in part to the names used to designate each.

TABLE 9-2. *Personality traits obtained by factor analysis*

1. CYCLOTHYMIA	*versus*	SCHIZOTHYMIA
Idealistic		Cynical
Friendly		Hostile
Genial		Cold hearted
Trustful		Suspicious
2. MENTAL CAPACITY	*versus*	MENTAL DEFICIENCY
Intelligence		Stupid
Painstaking		Slipshod
Thoughtful		Frivolous
Deliberate		Impulsive
Wide interests		Narrow interests
Mentally mature		Mentally immature
3. EMOTIONAL MATURITY	*versus*	EMOTIONAL IMMATURITY
Practical		Unrealistic
Stable		Uncontrolled
Patient		Impatient
Deliberate		Impulsive
4. PHLEGMATIC	*versus*	HYPERSENSITIVE
Balanced		Neurotic
Self-controlled		Easily frustrated
Calm		Excitable

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[12] R. B. Cattell, *Description and Measurement of Personality* (Yonkers-on-Hudson: World Book Co., 1946).

TABLE 9-2. *Personality traits obtained by factor analysis* (Cont.)

5. DOMINANT	*versus*	SUBMISSIVE
Assertive		Modest
Willful		Gentle
Sophisticated		Meek
Talkative		Introspective
Hard		Sensitive
6. SURGENCY	*versus*	MELANCHOLIC
Cheerful		Dour
Optimistic		Pessimistic
Sociable		Aloof
Genial		Coldhearted
7. POSITIVE CHARACTER	*versus*	DEPENDENT CHARACTER
Independent		Dependent
Reliable		Irresponsible
Realistic		Autistic
Loyal		Fickle
8. CHARITABLE	*versus*	OBSTRUCTIVE
Kindly		Cynical
Cooperative		Uncooperative
Friendly		Hostile
Frank		Secretive
Grateful		Thankless
9. SENSITIVE IMAGINATIVE	*versus*	RIGID, TOUGH
Idealistic		Cynical
Intuitive		Logical
Rationalistic		Realistic
Gentle		Hard
10. VIGOROUS	*versus*	NEURASTHENIC
Alert		Languid
Strong willed		Impulsive
Assertive		Meek
Quick		Slow
Adventurous		Timid
11. SOCIALIZED, CULTURED	*versus*	BOORISH
Aesthetic		Indolent
Refined		Careless
12. SURGENT CYCLOTHYMIA	*versus*	PARANOIA
Enthusiastic		Apathetic
Good natured		Surly

CONDITIONING FACTORS IN PERSONALITY DEVELOPMENT

Hereditarian factors. The previous chapters have emphasized that development from conception until death is always dynamic, altering relationships between the internal states of the individual and his environment. Personality development at any stage, even during the prenatal, is the result of relationships between gene potentiality and varied environmental factors. Thus, many of the traits commonly attributed exclusively to heredity are to a considerable extent the result of certain inherited potentialities which are modified by environmental conditions.

Early home influences. Among the basic needs of the child are affection, a feeling of security, and a feeling of belongingness. These needs will be discussed further in Chapter 10. The close relationship between the satisfaction of these needs and wholesome personality development has been observed from many case studies. During the early months of life the infant child needs attention and affection. These needs appear to be best met in the home. There is evidence that the younger a child is when he is deprived of this source of security and affection, the more serious will be the effects on his personality.

The attitudes of the parents toward each other and toward the child will have an important bearing on his personality development. The importance of well-balanced affectional relations in the home has been emphasized in studies of child growth and development. The child should feel that he is part of the home, that he is wanted, and that he has certain responsibilities as members of the family unit. Some parents become so involved with activities and events about them that they become indifferent to the needs and problems of their children. On the other hand, a parent may be so overindulgent with his children that they develop such undesirable traits as selfishness, self-concern, or a total disregard for the rights and welfare of others.

In one study a family adjustment score and scores from the California Test of Personality were used in determining the relationship between certain personality characteristics and family adjustment.[13] There are many instances where the adjustment between the parents and children appear satisfactory for one child and unsatisfactory for the other. In such a case the parent has been unable to understand and cope with the peculiar needs of the individual child. The results of Stott's study, presented in Table 9-3, reveal that children who rate low in their personal and social adjustments tend to have unsatisfactory relations with their parents. It appears that good parent-child relations will largely depend first upon satisfactory relations between the parents and second upon the ability and desire of the parents to meet the peculiar needs of each individual child.

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[13] Leland H. Stott, "Parent-adolescent Adjustment, Its Measurement and Significance," *Character and Personality*, Vol. 10 (1941), pp. 140-150.

TABLE 9-3. *Correlations between the "family-life" variable and scores on the* California Test of Personality

CALIFORNIA TEST SCORE	CORRELATION
Total adjustment	+ .62
I. Self-adjustment	+ .50
a. Self-reliance	+ .27
b. Sense of personal worth	+ .32
c. Sense of personal freedom	+ .55
d. Feeling of belonging	+ .44
e. Freedom from withdrawing tendencies	+ .46
f. Freedom from nervous symptoms	+ .33
II. Social adjustment	+ .62
a. Social standards	+ .27
b. Social skills	+ .42
c. Freedom from antisocial tendencies	+ .44
d. Family relations	+ .65
e. School relations	+ .43
f. Community relations	+ .36

Contrary to general belief there is no one position in the family circle that might be regarded as the ideal, although different positions involve different problems and have differential effects upon the individuals concerned. The age of the parents, the financial conditions of the home at various stages, the activities of the parents, and the sex composition of the children are variables which will affect the growing child at different stages in his development. There is some evidence that an only child is more dominant in nature than children with brothers and sisters. According to a study by Kawin, a preponderance of socially-maladjusted children are to be found among the only children.[14] Certainly the only child is in a hazardous position. Overprotection, overindulgence practices, and too much attention are likely to be visited on the only child by well-wishing parents.

Cultural factors. The importance of culture in the development of attitudes and values was discussed in the previous chapter. In our culture the child must learn to play his role as a member of a particular group. Oftentimes subcultures produce special personality characteristics. The child reared in one subculture group may develop personality characteristics which bring him into conflict with his environment when he enters into a different subculture group. This may be observed in the schools where children from different social-class groups are brought together. The group dynamics found in different subcultures should be recognized and understood by teachers in their attempt to guide the activities of pupils from various cultural backgrounds.

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[14] E. Kawin, *Children of Preschool Age* (Chicago: University of Chicago Press, 1930).

Learning maturational relationships. Although the influence of maturation has been studied in connection with the acquisition of language and motor skills, few attempts have been made to observe its influence in personality development. As boys and girls grow into adolescence they take a different attitude toward members of the opposite sex and toward their own physiological selves. With each new-found ability changes in personality may be said to occur. The child who has learned to skate develops added confidence, more interest in skating, and the desire to participate in group activities to an increased degree. When the child learns to spell and write he finds that he has new skills to use in meeting certain problems and satisfying existing needs.

The playground, school, camp, and church bring boys and girls together in varying learning situations. As they mature and learn, changes may be noted in their personality development. However, there is good evidence that these changes are in harmony with personality characteristics established during the preschool years.

THE MEASUREMENT OF PERSONALITY

It is obvious from the preceding discussion that personality is much too complicated to measure in its entirety. There can be no one "personality test." It is only possible to sample aspects of personality and from this to infer certain conclusions about the rest of it. The following pages, then, concern various methods of sampling personality.

As with any other form of sampling (public-opinion sampling, sampling the effects of advertising, inspection sampling in industry, etc.) personality sampling can be accurately interpreted only by use of the most careful statistical procedures. These are too complicated to discuss here but are explained in any textbook on statistics. Only those who are acquainted with the statistics of sampling are qualified to interpret the results of personality sample tests.

Acquaintance rating. When personality is looked at from the stimulus aspect, or the aspect of social effect, it is then "measured" by sampling its effect on acquaintances.

A device for doing this is the "acquaintance rating scale," quite similar to the merit-rating scales used in industry. A personality trait is specifically described and then gradations of that trait described. The acquaintance is then asked to check the gradation which comes nearest to describing the personality being rated. Sometimes a specific instance to illustrate the rating is asked for. Table 9-4 is one of twelve traits given on a personality rating scale.

TABLE 9-4. *Extract from a personality rating scale*

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2. *Is he tolerant of new ideas; is he openminded and receptive to progressive suggestions?*

____________. Eagerly welcomes new ideas and suggestions.
____________. Open to ideas and suggestions but not enthusiastic.
____________. Sometimes openminded; sometimes resents new suggestions.
____________. Usually opposes suggestions of change.
____________. Vigorously resents any change from accepted routine.
I have no opinion of this individual regarding this trait ____________________.

Another method sometimes used for acquaintance rating is the man-to-man scale developed during World War I by the army for use in officer-training school. The procedure is for each acquaintance or rater to prepare his own scale by selecting a personal acquaintance who typifies each degree of each trait. A modified form of this, useful in studying elementary-school children, is the "Guess Who" test. This test was developed by Hartshorne and May for use in studying deceit among children.[15] This procedure involves the use of descriptive paragraphs showing different types of personality, such as a neat, restless, or agreeable boy or girl. Following the reading of the paragraph, the children are requested to write down the names of the children in their group who seem to fit into the descriptive pattern.

Another method of getting acquaintance ratings is the use of a check list. From a long list of statements about personality, ranging from highly commendable to the opposite extreme, the rater is asked to check a certain number of these (usually five) which most nearly fit the person being rated. Each of the statements carries a weight and a total of the weights for the five (or more) statements checked is the personality score. Selected items from such a check list are given in Table 9-5.

The rating scale has been found to be useful for rating elementary-school children, especially when the ratings are confined to traits manifested in school situations. This may be accounted for, in part at least, by the fact that elementary-school teachers become well acquainted with their pupils, and the activities of elementary-school children are more natural and less in-

[15] H. Hartshorne and M. May, *Studies in Deceit* (New York: The Macmillan Company, 1928).

TABLE 9-5. *Personality check list*

Directions: Check five (no more, no less) statements of the following list which best fit ________________________.
(Name of person rated)

( ) 1. He is very superior in school work.
( ) 6. He is hot-tempered.
( ) 7. He is emotionally unstable.
( ) 11. He is very punctual and dependable.
( ) 14. He is a great procrastinator.
( ) 16. He is well liked by everyone.
( ) 20. He is very altruistic; likes to help others.
( ) 26. He is sarcastic and scornful of others.
( ) 27. He is very average in ability.
( ) 30. He is selfish and egotistical.
( ) 33. He is a natural leader; others like to follow him.
( ) 35. He works very hard.
( ) 37. He is usually unable to understand anything difficult.

hibited than those of junior- and senior-high school students. The usefulness of the teacher's estimates of her pupils in light of her day-by-day relations with them cannot be overestimated; however, too wide a generalization from these ratings leads to many errors. Goodenough refers to an unpublished study carried out at the Institute of Child Welfare of the University of Minnesota which bears this out.[16] Only a moderate relationship was found between the indexes of talking obtained for nursery-school children in different situations. An outstanding example was cited of a nursery-school child who scarcely uttered a word during her three years of attendance at the nursery school, but who had a very high index of talkativeness at home.

Personality inventories and questionnaires. The personality inventory was developed by Woodworth as a means for measuring neurotic tendencies. Some questionnaires cover a wide range of human troubles and may be given by oral interview. Other questionnaires are limited to single traits, such as introversion-extroversion. Typical questions are as follows:

Do you usually sleep well? *Yes* *No*
Do you ever walk in your sleep? *Yes* *No*
Did you have a happy childhood? *Yes* *No*
Were you shy with other boys? *Yes* *No*
Do you ever feel that things are not real? *Yes* *No*
Are your feelings easily hurt? *Yes* *No*
Do your interests change quickly? *Yes* *No*

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[16] Florence L. Goodenough, "The Appraisal of Child Personality," *The Psychological Review*, Vol. 56 (1949), pp. 123-131.

The *Minnesota Multiphasic Personality Inventory* contains over 500 questions which concern nine types of personality perversions. These are 1. hypochondriasis (undue concern about bodily complaints), 2. depression, 3. hysteria, 4. psychopathic deviate (disregard of social motives), 5. paranoia (suspiciousness), 6. masculinity-femininity, 7. hypomania (excessive activity), 8. psychasthenia, and 9. schizophrenia. A high T score on any trait indicates symptoms of that tendency which should be further investigated. Schmidt found that 90 neurotic adults made higher average scores on all nine tendencies than did 98 normal adults.[17] (These data are shown in Fig. 9-3.)

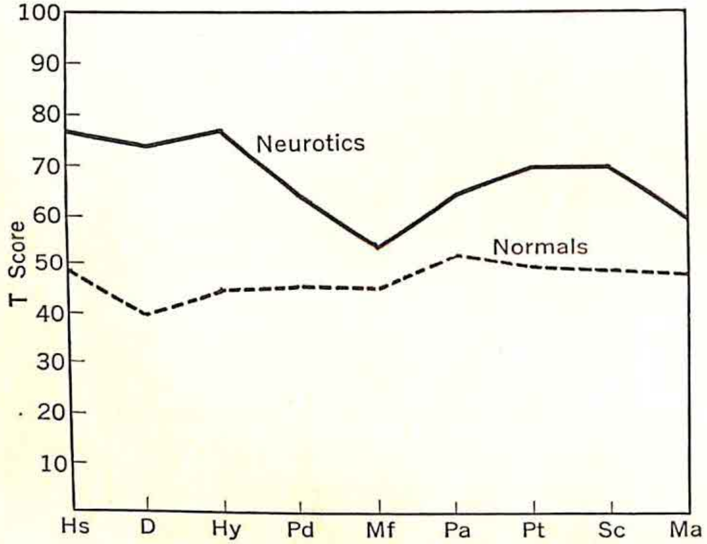

FIGURE 9-3. Profiles of 98 normal and 90 neurotic adults on the *Minnesota Multiphasic Personality Inventory*

This and other trouble questionnaires are of little value, however, if the testee knows what the normal answer is and wishes to be dishonest in his answers. Some tests have a "lie score" which indicates if the testee has been untruthful in answering the questions, but this does not provide a correction factor. Tests of this sort are often useful in diagnosis but not of great value in general personality measurement.[18]

Projective techniques. Sometimes a well-controlled or repressed personality tendency (like a sex want, or a hate for a close relative) will show up at times when inhibitions are off guard. A strong but repressed want may be "projected" into a situation where it is least expected, like in dreams or in imagination, on the assumption that repressed wants and aversions will be projected into that imagination. Ways of doing this are called "projective techniques."

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[17] H. D. Schmidt, "Test Profiles as a Diagnostic Aid," *Journal of Applied Psychology,* Vol. 29 (1945), pp. 115-131.

[18] Albert Ellis, "Recent Research with Personality Inventories," *Journal of Consulting Psychology,* Vol. 17 (1953), pp. 45-49. This conclusion is borne out by the studies of Ellis. He concludes that these inventories do not measure the independent traits they are supposed to be measuring.

The Rorschach Ink Blots. If a piece of paper is folded through the center of a fresh drop of ink and the sides pressed together, it will make a bifurcated blot which will be bilaterally symmetrical. A typical example is shown in Figure 9-4. The ten Rorschach ink blots are similar to this although some are partly colored.[19] The testee is shown on a blot and asked "What might this be?" "What do you see?"

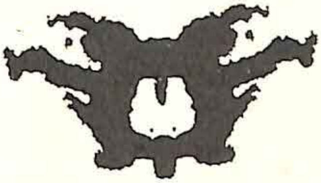

FIGURE 9-4. An ink blot similar to those of the *Rorschach Test*

Responses are scored in terms of total number of things seen, whether they involve the whole blot or only parts, qualities of responses (color, form, movement), and kind of things seen (animals, plants, people, anatomical parts, etc.). Typical personality aspects allegedly revealed by these responses are as follows: "rich mentality," "creative capacity," "breadth of interest," "large degree of self-will," "special phantasies peculiar to own need," etc.

The interpretation of Rorschach Ink Blots is not standardized and there are no norms. While Rorschach testers are enthusiastic about their results, experimental evidence to support such enthusiasm is meager. Thurstone has said that "Rorschach students are not making any worthwhile contributions to psychological science as long as they remain in their gullible and uncritical acceptance of fanciful interpretations of the responses to a single set of inkblots."[20]

The Thematic Apperception Test. This test consists of a series of pictures, usually of people, about which the testee is instructed to tell a story. He is asked to tell what is happening, what events led up to it, and what the outcome will be. His stories are then diagnosed to discover any "themes" that may run through them which may indicate hidden personality aspects that are being "projected" into the stories.

There is evidence, both theoretical and practical, that these free associations and free responses provide some basis for interpreting the personal and social needs of the individual. One of the major criticisms of projective tests centers about the lack of objectivity of such techniques, and the reliance upon the subjective evaluation of the individual's responses. This criticism has merit. Caution should be observed, however, in attempting to arrive at a quantitative score for all aspects of personality. Its intangible and interdependent nature makes it difficult and perhaps impossible to describe in purely quantitative terms based on some composite score. It is in the areas of a more intangible nature that projective tendencies are of greatest value. There is a danger, however, in the interpretations which might be given to these uninhibited responses, when these interpretations are made by untrained persons or individuals who are the victims of maladjustments.

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[19] A good and not too technical discussion of this technique is given by T. W. Richards, *Modern Clinical Psychology* (New York: McGraw-Hill Book Co., 1946).

[20] L. L. Thurstone, "The Rorschach in Psychological Science," *Journal of Abnormal and Social Psychology*, Vol. 43 (1949), p. 474.

Anecdotal records. The observation method is the oldest and perhaps most widely used of all research methods. The procedures for using it has been refined and standardized so that the results obtained are oftentimes very reliable. Within recent years the observational method in the form of anecdotes have been used in studying child and adolescent behavior in various situations. The anecdote is simply a descriptive account of some incident or occurrence in a child's life activities. This description is recorded so as to give it increased stability and permanence.

SUMMARY

Personality is a term used in psychology to indicate all those aspects and attributes of a person which identify him as an individuality. Interests, attitudes, intelligence, beliefs, emotions, habits, character, temperament, physical characteristics—are all attributes or traits of personality. The integration and patterns of intrarelationship of these attributes give a person his individuality, his personality.

The development and growth of personality is controlled by the integration of inherited potentialities with day after day experiences. Personality is not something the individual has, but rather *how the individual acts*. It is the product of its own functioning. Early home influences have a very important effect upon the growing personality. The cultural pattern in which the child resides and grows is very important. The child's maturation and learning must be considered at all stages in the measurement and guidance of personality development.

Important in any personality reform is diagnosis and measurement. Tests have been developed which help locate a trait that deviates from normal. Personality tests, however, are more useful in diagnosing personality difficulties than they are in measuring the various traits of personality in metrical units. This is especially true of the projective techniques. Personality cannot be measured accurately by present-day procedures.

Questions and Exercises

1. Write down all of your own personality attributes or traits which you consider to be good or advantageous; now make a list of those which you consider to be harmful or to handicap you in some way.
2. Try to locate the origin of each attribute you have just listed. Which ones seem to be hereditary and which seem to have been learned?
3. How would you classify your own personality as to type? Would you consider yourself to be—1. a *social* type; or 2. an *emotional* type; or 3. a *conformity* (easily-influenced) type; or 4. an *inquiring* type; or 5. a *self-confident* type?
4. Construct a rating graph, using the five personality types just mentioned, and have several of your friends rate you as—

   ____________________To a high degree
   ____________________Above average
   ____________________Average
   ____________________Below average
   ____________________To a low degree

   Compare these with your own rating of yourself.
5. What effect do situations of stress (whether physiological, social, or emotional) have on personality? Describe some stress situation you have been in and your behavior to it.
6. Describe one of your own personality traits which you would like to change. Write out a plan, based on preceding chapters in this book, for reforming this trait. Be sure to make a careful diagnosis of its origin.

Recommended Readings

Cattell, R. B., *Personality* (New York: McGraw-Hill Book Co., 1950).

Garrison, K. C., *Psychology of Adolescence,* 4th ed. (New York: Prentice-Hall, 1951), Chap. XIV.

Gray, J. S., *Psychology Applied to Human Affairs,* 2nd ed. (New York: McGraw-Hill Book Co., 1954), Chap. VI.

Harsh, C. M., and Schrickel, H. G., *Personality* (New York: The Ronald Press, 1950).

Hartley, E. L. *et al., Readings in Psychology* (New York: Thos. Y. Crowell Co., 1950), Chap. XV.

Hilgard, E. R., *Psychology* (New York: Harcourt, Brace and Co., 1953), Chap. XVIII.

McKinney, F., *Psychology of Personal Adjustment*, 2nd ed. (New York: John Wiley and Sons, 1949).

Munn, N. L., *Psychology*, 2nd ed. (Boston: Houghton Mifflin Co., 1951), Chap. XXIV.

Murphy, G., *Personality* (New York: Harper and Bros., 1947).

Ruch, F. L., *Psychology and Life*, 4th ed. (Chicago: Scott, Foresman and Co., 1952), Chaps. II and XIV.

CHAPTER 10

Personality Adjustments and Mental Hygiene

IN THE PREVIOUS CHAPTER personality was described as the sum total of traits and inclinations of the individual. It is conceived of as an outgrowth of the interaction of hereditary characteristics and all the forces and conditions encountered by the growing child. This was what Walt Whitman meant when he wrote, "A child went forth and he became a part of all that he encountered." It appears that through varied experiences, many of which are trial-and-error in nature, most individuals develop habits, attitudes, and values which are somewhat harmonious. These may not, however, be harmonious with scientific knowledge and logic; although they are subjectively harmonious insofar as the individual is concerned. Such individuals are the well-integrated personalities. The teacher and mental hygienist should be aware of this and avoid procedures that would lead the individual to develop certain behavior patterns completely at variance with other characteristics. All of this means that the entire individual must be considered in any educational or mental hygiene program. The failure of this may be noted from the case of Jack.

> Jack was the oldest of two sons of a textile worker. His father was well-adjusted but ignorant and without ambition for himself or the members of his family. He had dropped out of school while in the ninth grade. Jack's mother was an intelligent person from an underprivileged home background. She had completed the fifth grade in school, but was quite ambitious for her two sons to attain a college education and thus be able to attain a better standard of living and a higher socio-cultural status. The influence of the mother was

noticeable in Jack's vocational desires. He wished to become an industrial arts teacher, have a nice home, and a well-equipped shop in his basement. His social interests, however, were on the plane of the industrial environment in which he was raised. Hill-billy music, the beer parlor, hot-rod driving, and Saturday night brawls characterized his out-of-school activities and interests. He had few friends in high school, but managed to pass his work with low marks.

Upon graduating from high school Jack entered a teachers college. There he found life most unhappy. This was obvious from a letter to one of his buddies back home, when he stated: "I didn't know college was like this. I ain't had no fun since I got here. Most of the boys are "stuck-up" or are a bunch of "sissies." I don't mind studying some; but a fellow has to have some fun. I am going to celebrate some how this Saturday night." Jack failed most of his work at the end of the first term. He then dropped out of school and joined the army, since he was definitely eligible for the draft. This ended Jack's school career.

FUNDAMENTAL NEEDS OF THE CHILD

"Needs" are often a source of confusion because of the different usage of the word. One person will emphasize the biological needs, another a group of social needs, while another may emphasize certain psychological needs. *A need may be said to exist when there is a state of tension present which serves to direct one's behavior toward certain goals.* It will be pointed out in Chapter 12 that these needs may be conceived of as motives and are very important in connection with motivation and learning. In relation to motivation a need may be defined as a state of tension which leads an individual to direct his activities toward certain goals which will relieve the tension.

There is no *one* accepted classification of needs; although most students of child psychology recognize that a multiplicity of needs exist. A number of writers have attempted to classify needs into three categories, however, the exact names given to these categories are not uniform.[1] In the discussion that follows needs will be classified into the three categories suggested by Bernard.[2]

Organic needs. The basic organic needs include food, rest, sleep, and play. A satisfaction of these needs is essential for survival, although the relative importance of the different needs will vary with different children.

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[1] For example Thorpe lists the three categories as: physiological, self, and social; Bernard lists the three categories as: organic, personal, and social.

[2] By permission from *Mental Hygiene for Classroom Teachers* by H. W. Bernard (Copyright 1952, McGraw-Hill Book Co. Inc., New York), Chap. II.

Some children are much more active than others, they will need more food to furnish the energy used in various activities. Some children will need more rest than others; some will require more of certain mineral content than others; while some will need more sunshine than others. There are many organic needs that appear less important for immediate survival. Some of these include sexual gratification; the craving for sweets; the need for relief from pain; the need to avoid intense light or excessive noise.

Personal or psychological needs. The satisfaction of the organic needs is essential for physical health and life itself. Certainly next to these needs, and within certain limits as important, are the personal needs. The satisfaction of certain personal needs is essential for the development of well-adjusted personalities and good mental health. Some of the most important personal needs will be briefly presented in the following discussions.

NEED FOR AFFECTION. The child from the very beginning needs love and affection. Babies need to be cradled and loved, especially when they are being fed. As the child grows older, cuddling tends to give way to other means of showing affection. Affection is expressed verbally or through praise and the avoidance of criticisms. In all forms of affection there exists to some extent the association of two or more personalities. The need for affection, and the values derived from it, may best be described as a two-way affair. This may be observed in the reactions of the infant child to cuddling by the mother. The child early responds with affection to those adults who care for him and give him affection.

One study furnishes good evidence of the value of attention and affection which the child receives in his home relations.[3] Children from homes where they enjoyed the attention of adults showed a more favorable course of development than did children reared in an institution. Concerning the importance of affection for the development of a healthy personality, Menninger has stated: "Among the basic requirements for healthy development of personality probably the most difficult lesson that every child needs to learn—and many adults should, but have not learned—is how to love and be loved." [4]

THE NEED FOR SECURITY. The child needs from the very beginning of life affection and security. It is at this point that the child from the happy home, who is accepted and wanted by both parents has a great advantage. As the child develops, he needs to feel that he is wanted and has a place to fill in his orbit of living.

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[3] W. Goldfarb, "The Effects of Early Institutional Care on Adolescent Personality," *Journal of Experimental Education*, Vol. 12 (1943), pp. 106-129.

[4] W. C. Menninger, "Mental Health in Our Schools," *Educational Leadership*, Vol. 7 (1950), pp. 510-523.

When a child enters school for the first time, he is faced with problems of adjusting to many conditions and situations, some of which are new or different for him. In the first place there are many other children to be considered. If the child has been accustomed to being the "center of attention" at home, he will now find that the attention and affection of the teacher must be shared with other children. As he develops further, he will find himself competing with others for success and recognition on the playground and in the classroom. It is at this time that feelings of insecurity may develop as a result of his inability to compete successfully with certain members of the group in some activities. The indiscriminate use of report cards as well as other means of bringing this to the child's attention oftentimes aggravates the problem.

NEED FOR ACHIEVEMENT. The need to achieve is closely related to the need for security. The need for *a feeling of personal worth,* which grows out of achievement is essential for the healthy development of the school child. The child's feeling of security and personal worth is not enhanced by the teacher insisting that he achieve a certain level of competency in his school activities, especially when such a level is beyond his ability. Rather the child needs to experience a feeling of satisfaction from the performance of school tasks. The teacher can promote this by expressing satisfaction when the pupil displays some skill or ability. Children are very sensitive about the attitude of their teacher. Thus, a child who feels that the teacher is interested in him and appreciates his worth will benefit from suggestions and even criticism that may be offered by the teacher.

The need to make use of newly developed abilities is constantly appearing as the child grows and develops toward maturity. This may be observed when the seven-year-old girl learns to skip rope or skate. This need also appears in the questions asked by children displaying their curiosity and increased understanding of problems and situations. Teachers should realize that these questions present a starting point for learning and growth. They should encourage the creative activities, questions, and other achievements of children. In so doing they promote development and learning as well as good mental hygiene.

THE NEED FOR INDEPENDENCE. The child begins life completely dependent upon others. The period of infancy is longer for the human being than for any other form of life. However, if the constancy of growth principle is to operate the child must be given increased independence and responsibility with each advanced level of maturity. The unwillingness of many parents to "let go" is one of the greatest barriers to the development of well-

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The needs of children are satisfied through wholesome and pleasant experiences

adjusted personalities. The failure of many teachers to practice democratic principles and thereby give the students increased responsibilities and opportunities to participate in planning and carrying out various projects leads to problems of discipline and fails to develop the type of boys and girls needed for citizenship in a democratic society. Teachers may well ask of themselves:

1. Do the students of my class have an opportunity to participate in determining problems on which they will work?
2. Are the students of my class given considerable liberty in the development of projects or even in preparing a class report?
3. Am I willing to admit to my students that "I don't know," in answer to questions about which I am not informed?
4. Are the students of my class free to discuss with me their various problems?
5. Do I give special consideration to the problems and questions of my students, even though they may seem trivial to me?

6. Do the students of my class have an opportunity to defend themselves against accusations or unjust demands?

Social needs. The distinction between personal and social needs is not always clear. This is to be expected, since most personal needs have very definite social implications. There are some who regard the need for affection as a social need, since it involves others. The satisfaction of social needs is important for good personal adjustments and essential for satisfactory social adjustments and development.

The need for recognition. The child needs to feel at an early age that he has a role to play, that his contribution to the home is worth while, and that he is needed and wanted. The need for feeling that one is good for something develops out of a recognition of the satisfaction of success by the individual. Thus, the child should at various stages in his growth and development be faced with tasks which he can accomplish, but which also challenge him. He likewise needs recognition when he succeeds in the performance of such tasks. His attitude toward his own world will be conditioned largely by the attitude his parents, teachers, and others take toward him in his various school and out-of-school activities.

A practical aspect of the need for recognition is that it is an important source of motivation. The child tends to repeat those forms of behavior which brings forth recognition, especially from those whom he admires. Satisfaction of the need for recognition may come from undesirable as well as desirable forms of behavior. The child who resorts to acts of mischief, such as pinching some other child, may be doing this to secure attention from some of his classmates. Studies of factors contributing to delinquency reveal that lack of recognition at home or at school is often an important factor in such behavior. Many common defense mechanisms, discussed later in this chapter, have their roots in a thwarting of this basic need.

Need for belongingness. It was pointed out in Chapter 7 that the process of growing up socially is one of becoming less egocentric and individualistic and more sociocentric in nature. The young child is dependent upon his adults for recognition and support; but with advancement toward maturity he must look to his peers for recognition and social approval. He must accept his role as a member of the group. He must adjust to increasingly complex social situations, in which belongingness becomes more and more important. A failure in social approval and belongingness, which makes for the "isolate" is likely to result in personal as well as social maladjustments.

Other social needs. Other social needs that have been listed in addition to the needs for recognition and belongingness are:

The need for companionship
The need for social approval
The need for mutual affection
The need for sharing

It has already been suggested that these needs do not operate independently. This fact makes it very difficult to classify needs, even into broad categories. The social needs are largely culturally determined. They result from early childhood experiences in the home and neighborhood; however maturation plays an important role in the appearance and characteristics of some of these needs.

GENERAL NATURE OF ADJUSTMENT

The term "adjustment" may be regarded from two viewpoints. In the first place it might be conceived of in terms of the relationship between the individual and his environment. The well-adjusted person is said to function in harmony with his environment. His efforts are successfully directed toward the establishment of harmonious relations between himself and the various forces and conditions in his environment. A second way of looking at the meaning of adjustment takes into consideration the state of the individual person concerned. In this case the person is well-adjusted if his needs are being met and he is relatively free of conflicts and frustrations. This person is happy in his environment, although others may sometime look upon him as a misfit, especially if his behavior is not in harmony with the environmental forces. For example, the child at school may be happy in his classroom when he is the center of attention through his acts of mischief. However, by the standard of a harmonious relationship with his environment he would be regarded as maladjusted.

The definition one holds of adjustment is most important. It will determine his goals in teaching and guidance. It will be an important factor in pupil-teacher relations and classroom discipline and control.

ADJUSTMENT PROBLEMS DURING CHILDHOOD

An adjustment problem may be said to appear when the attainment of a need is thwarted or progress toward a goal is blocked. Under such a condition the individual tends to become tense and this tension persists until an adequate response is made. When there is nothing to hinder the individual from reaching the goal, action directed toward it will occur and no adjustment problem will appear. The child's needs are continuously being blocked by varying circumstances and conditions in his environment. Thwartings may result from (1) physical factors in the environment, (2) social factors and conditions, (3) economic conditions or factors, (4) personal defects or limitations, (5) incompatible needs producing internal conflicts, and (6) conflicts between ideals and certain needs.

The extent to which thwartings and conflicts lead to maladjustment depends upon a number of factors, such as (1) the dynamic nature of the need that is blocked, (2) the extent to which it is blocked, (3) the possibility of finding a suitable substitute goal, and (4) the extent to which the child is fortified by affection, security, and a feeling of personal worth. The child who is unwanted or rejected by parents and friends will display characteristics of instability and general lack of self-control. When the need for affection is denied, the child may resort to stealing, exhibitionism, lying, or other forms of behavior in an effort to adjust to such a condition. Lawrence Lader has described a case of a child's lying in order to adjust to a need for affection.

> At the age of eight, Jane was continually fibbing. When her classmates talked about ponies, Jane insisted that she had one. When they talked about chickens, she told them about her chicken coop. One day she insisted her father was an aviator; the next day that he was a policeman. Her teacher warned her that if she didn't stop, she would be punished. But the fibbing continued.
>
> One day the teacher visited Jane's home. She found that Jane had a younger brother who had been the family pet since his birth two years before. Although unjustifiably, Jane had built up the idea that her parents were no longer interested in her. What Jane needed, the teacher realized, was not discipline but affection. Since her own world wasn't fulfilling her needs, she was creating an artificial one.
>
> The teacher persuaded Jane's parents to give her more attention and suggested buying her a dog. In class, the teacher gave Jane a new sense of importance by putting her imagination to work through school plays, and introduced real adventure into her life with trips to museums and zoos. In a few months, Jane's fibbing ceased.[5]

Importance of favorable home conditions. A fairly large percentage of America's children come from underprivileged homes with substandard living conditions. That such conditions are not conducive to favorable learning and development is borne out by the number of such children found among the retarded, school drop-outs, and truants.

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[5] Reprinted from *This Week* Magazine, April 30, 1950. (Copyright, 1950, by the United Newspapers Magazine Corporation.)

A study by Bolles, Metzger, and Pitts furnishes evidence that an unfavorable home background during childhood contributes to personality maladjustments.[6] These investigators interviewed 142 women psychiatric patients suffering from functional mental disorders and 153 women who were not under medical care for either physical or mental illness. Based upon results from these interviews a home-background scale was applied to each case. The results of this study are summarized in Table 10-1. It may be noticed from the summary that the differences between the normal and psychiatric women are most marked in the percentage of cases included at the extremes of the scale. One-half of the normal women reported a favorable home environment during early childhood, while only 25 per cent of the psychiatric women reported such a home. Only 1 per cent of the normal women reported a very unfavorable early home environment as contrasted with 17 per cent of the psychiatric women. The inference of this study, supported by related studies, is that an unfavorable home environment during early childhood is an important contributing factor to the development of personality maladjustments.

Effects of overprotection. Overprotection may result from either domination or indulgence on the part of one or both parents. In either case the child is shielded from situations which might challenge his initiative. He is deprived of the opportunity to engage in highly competitive physical and motor activities. Very often the parents are overconcerned about the

Table 10-1. *Early home background of normal women and psychiatric patients*

	NORMAL WOMEN PER CENT	PSYCHIATRIC PATIENTS PER CENT
I. Very unfavorable home—evidence of factors conducive to marked insecurity and instability	1	17
II. Unfavorable home—evidence of some factors leading to instability and insecurity	17	33
III. Slightly unfavorable home—evidence of factors which might, under certain circumstances, make for insecurity and instability	32	25
IV. Favorable home—no evidence of factors conducive to insecurity and instability	50	25

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[6] M. M. Bolles, H. F. Metzger, and M. W. Pitts, "Early Home Background and Personality Adjustment," *American Journal of Orthopsychiatry*, Vol. 11 (1941), pp. 530-534.

child's health and general physical well-being, so that they watch closely his diet and daily activities. The parents expect little from the child and protect him from all adventurous undertakings. In cases of overprotection parents often show much inconsistency in their relations to the child. They are afraid to say "no" to him, since this might keep him from loving them; however they are afraid not to say "no" when he wishes to do something which they regard as dangerous.

There are certain characteristics which appear among children where overprotection appears. The child is first of all *immature* in many of his reactions, since he has not been given the opportunity to grow up. Such children lack self-reliance, and seek security with their parents, usually the mother, who has shielded them from thwartings and other difficulties. The personality of the spoiled child (one suffering from indulgence) is likely to be egocentric and selfish in nature. He responds poorly to tasks when he cannot have his own way about them. The dominated, overprotected child is likely to be submissive, obedient, and to withdraw when faced with a difficulty.

EFFECTS OF REJECTION. The rejected child may be described as unwanted. Oftentimes the parent displays outright hostility either through words or by overt acts toward the child. Interviews with such parents indicate that they frequently have no plans for the child's future, but are anxious for him to grow up and get "on his own." In homes of good financial circumstances the rejected child is sent to a camp, probably to a boarding school, and to other places where he will not interfere with the activities of the parents. There is little companionship with the parents, and such children give no mention of help received from their parents.

The effects of rejection will vary with different children and with different situations; however there are certain patterns of behavior found frequently. The typical rejected child tends to display aggressive behavior. Such children are likely to be quarrelsome, rebellious, and untrustworthy. They sometimes develop an indifferent attitude towards others as a result of being rebuffed. However, some rejected children develop good social adjustments outside their home environment and display a sense of responsibility along with independence in action.[7]

EFFECTS OF OVER-ATTENTIVENESS. The composite picture of the over-ambitious parent is that of domination. The parents have set up their own peculiar standards and expect their children to accept them and measure up to them. Thus, the child is likely from an early age to be *forced* in school. The parents take the attitude that play on his part is largely a waste of time unless this will help him reach some goal set up by the parents for him, such as a boy making the football team to satisfy the aspirations of his father. There are times when parents attempt to satisfy their own unsatisfied aspirations or needs through their children.

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[7] M. Burgum, "Constructive Values Associated with Rejection," *American Journal of Orthopsychiatry*, Vol. 10 (1940), pp. 312-326.

A study conducted by Hattwick and Stowell of the social adjustments and work habits of elementary-school children showed that children who were babied or pushed by their parents had many more social adjustment difficulties than did children from better-adjusted homes.[8] These findings are presented in Figure 10-1. Children who were babied or pushed tended to develop more social difficulties as they advanced from the kindergarten through the first six grades at school. The behavior most characteristic of these children in order of frequency of occurrence was: socially immature, no sense of responsibility, nervous characteristics, dependent upon others, not well liked by others, self-conscious, the child plays for attention, day dreams, teases and annoys others, withdraws from the group, can't meet new situations well, is contrary and quarrelsome, insists on own way, and lacks self-reliance.

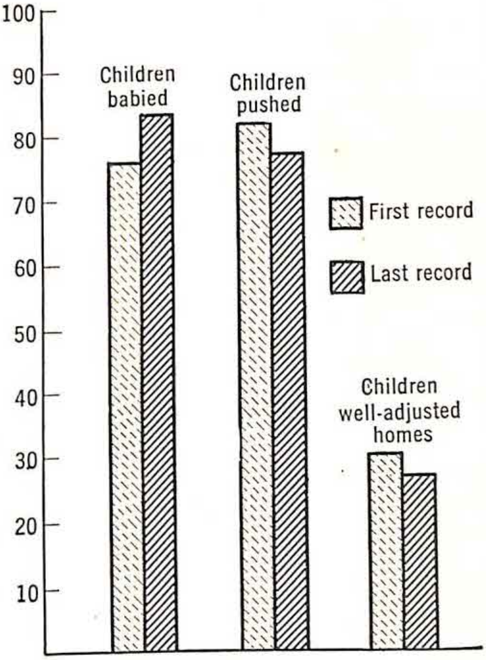

FIGURE 10-1. Relation of social adjustment difficulties to certain home factors

The importance of class culture. The conflict of class culture has come to be recognized as an important source of personality difficulties. The teacher's task is that of guiding boys and girls into improved ways of living and toward successful personal adjustments. When these boys and girls vary from their early childhood experiences in certain aspects of their lives they may find themselves unhappy misfits, since there is a lack of harmony between their present mode of living and their earlier established interests, habits, and ideals.

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[8] L. W. Hattwick and M. Stowell, "The Relation of Parental Over-attentiveness to Children's Work Habits and Social Adjustments in Kindergarten and the First Six Grades of School," *Journal of Educational Research*, Vol. 30 (1936), pp. 169-176.

The child from the lower-lower class group is most likely to grow up uncertain of the basic stability of life and things about him. This is a result of constantly changing conditions he has encountered in his way of living. The child may be shifted from one place to another in the sleeping arrangements. A new-born member of the family introduces problems which must be met immediately. Grandmother comes to live with the family, an arrangement very common among these families, and this introduces complications, which cause other changes in living arrangements. Thus, the child's home life is such that he is constantly encountering problems which must be met at the time rather than at some date in the future. The living arrangements of the parents are such that they do not work for long-time goals, but for day-to-day living. This condition results largely from economic pressures. Children brought up under such conditions and values will emerge unable to work for long-range goals.

School adjustments. The child's first entrance into school presents a focal point in his adjustments. He is faced with the problem of adjusting to many new and complicated conditions for which he is often ill-prepared. There is evidence from a number of studies that attendance at a nursery school or kindergarten is beneficial to the child in his school adjustments. However, entrance into nursery school may present adjustment problems for the child. The extent to which such problems appear will depend upon (1) the extent to which the child has been guided in his growth toward independence and self-reliance, and (2) the extent to which the nursery-school program tends to harmonize with the earlier home experiences of the children.

Among the adjustment problems the child faces at school may be mentioned the following: (1) the need for learning to share the affection and attention of the teacher with others; (2) the need to assume the role of membership in a group where he will not be able to be the center of attention; (3) the need to control emotional outbursts; (4) the need to accept a reasonable amount of routine which will be found even in the best program; and (5) the need to learn a role as a member of a group. If he is successful in making these adjustments, and if the balance between success and failure in his school activities is in favor of success, he will develop habits of self-confidence and a feeling of personal worth both of which are important for his personal and social adjustment. In this connection the kinds of report that are carried home are important. The effects of report cards become more serious as the individual passes through the grades and develops an increased social sensitiveness about his shortcomings. They appear to be the greatest source of conflict during the junior-high school period. This may be observed in the case of a seventh-grade student, referred to as Anne, who came to the writer's attention.

> Anne's report card, which she carried home, was what has generally been termed quite poor. The father was very much irritated over the poor showing in mathematics and social studies, and made some strong threats. Certain week-end privileges were taken from the girl, and she was required to spend more time with her studies. The girl seemed to withdraw from her classmates and indulged in considerable daydreaming. Little improvement was noted in her grades, and the father became all the more concerned and proceeded to visit the school principal about the matter, as he had earlier threatened to do. The principal looked up her record on the cumulative records and noted that she had never made good grades. He also observed that on one intelligence test she made a score which gave her an IQ of 86 while on a later test her IQ was listed as 82. The principal reminded her father that the girl's past work was not superior, and that he was perhaps expecting too much from her. The mother appeared to sense the problem better than the father, and brought the case to the attention of a psychologist. The below-normal intelligence was verified from administering the *Stanford Revision of the Binet Tests* to the girl. Tests of reading ability revealed a low comprehension score. The mother was told that the girl was definitely not of the academic type and should not be expected to make good and superior grades in school. A second visit to the psychologist by the mother, accompanied by the father, cleared up some points of confusion created from the traditional report card sent to the parents.[9]

MEETING DIFFICULTIES

The term "frustrations" used in connection with human adjustment, refers to any control or limitation imposed upon the individual that interferes or blocks the satisfaction of a need or drive. The child learns during the process of growing up that he cannot satisfy all his needs or wants. He meets at an early age boundaries set forth by nature. He finds that he is not big and strong and is unable to do many of the things which his father can do. He meets boundaries defined by his parents and other members of his family. At a later date he meets reality in the boundaries defined by the community and other children. When he enters school he finds limitations placed upon his behavior by the general school program. There are some who believe that frustrations are in themselves harmful. It is inconceivable, that healthy growth could occur in the complete absence of frustrations. There are, however, desirable as well as undesirable ways of meeting frustrations. When these boundaries are narrowed and autocratically imposed the development of the ability to meet frustrations through rational choices is seriously endangered. Again, when these boundaries melt away before the child's demands, the development of self-discipline on the part of the child is rendered null and void.[10]

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[9] Karl C. Garrison, *Growth and Development* (New York: Longmans, Green and Co., 1952), p. 424.

Frustrations and conflicts result in tension. The individual strives to reduce this tension. One of the striking differences in the personality of individuals is the way they react when certain needs are thwarted or conflicts appear in the satisfaction of their needs. The way an individual reacts to such situations or conditions is primarily a result of the manner in which he met difficulties and frustrations during the early years of life. This is clearly implied in the statement by Frank: "From psychiatric studies it is becoming clear that what is called mental health, or wholesome, well-balanced personality development depends in a large measure upon how the individual from birth onward meets the unavoidable tasks of life." [11]

A mental or overt adjustment becomes necessary when an individual is faced with a barrier to the attainment of a goal. Several possibilities are then open to him: he may resort to some form of *aggressive* behavior, either in an attempt to overcome the barrier or as a subterfuge; he may *compensate* for his weakness or inability to meet the situation successfully; he may resort to *rationalization,* thus falsifying the true motive and goal; or he may use some withdrawal or *escape* device, either in actuality or by subterfuge. The method used by an individual in meeting a barrier to the satisfaction of a need will depend primarily upon what has proved fairly effective in the past and the nature of the present situation. Most people develop fairly effective methods of meeting difficulties, although they may not always be regarded as most desirable.

Aggression. According to the Yale frustration-aggression hypothesis, when the needs of a child are thwarted, one form of response may be that of an excessive amount of self-assertion which may take the form of belligerency.[12] According to this hypothesis, aggression is always a consequence of frustration. However, it is recognized that aggressive behavior may take various forms. In the discussion here we will be concerned with the assertive and combative forms of aggression, although it is recognized that the various escape mechanisms, referred to later in this chapter, may be regarded as passive and resistive forms of aggression.

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[10] Frederick H. Allen, "Aggression in Relation to Emotional Development, Normal and Pathological," *Mental Hygiene,* Vol. 34 (1950), pp. 353-363.

[11] Lawrence K. Frank, "Working for Healthy Personalities," *Educational Leadership,* Vol. 3 (1946), p. 308.

[12] See John Dollard *et al., Frustration and Aggression* (New Haven: Yale University Press, 1939).

It was pointed out in Chapter 4 that anger results from the restraint of actions or inhibitions imposed upon the individual. This may be noticed when the small child is seriously limited in his physical activities or when he is denied a privilege which he has constantly enjoyed. He may resort to crying, kicking, or temper tantrums in an effort to successfully meet the frustrating situation. The most obvious form of aggression is that which occurs against the cause of the frustration. The child becomes angry at the parent who denies him certain privileges. The student becomes angry at the teacher who failed him in a course. Sometimes this aggression may become displaced. A child may admire his mother too much to display aggressive behavior against her, but takes the aggressiveness out on a doll. The father is fearful of displaying aggressive behavior toward his boss, but displays it toward his wife, child, or dog. The pupil at school may display his anger at his teacher by breaking out window lights of the school building.

Aggressive behavior is closely related to *egocentrism*. The "show-off" in class or on the playground, and the exhibitionist in general are examples of the operation of egocentrism. Such forms of behavior are usually motivated by the desire for attention, a need denied at home or certain other situations. *Sympathism* is also a common form of egocentrism. By means of sympathism the individual finds satisfaction by placing himself in a position where he will receive attention. He then becomes the center of attention through the sympathy bestowed upon him.

Less overt forms of aggression may be noted in common gossip against the person connected either directly or indirectly with the frustration. Deception may be used by the child to escape punishment. He may actually lie to his parents or teacher in order to avoid the unpleasant consequences which might accrue from telling the truth. This may either be regarded as a form of aggression or a form of escape. Aggression sometimes takes the form of retaliation or revenge. Such a form is likely to appear when the individual feels that he has been wronged, and is unable to secure justice. The general school program may be such as to aggravate some of these aggressive tendencies. Through recognizing the worth of each individual pupil and fair treatment, occasions for resentment and retaliation can be considerably reduced. A positive program of discipline which places the emphasis upon desirable forms of behavior rather than "don'ts" would tend to reduce frustrations and the accompanying aggressive behavior.

Compensation. The compensatory mechanism is based on the inferiority-complex theory presented by Adler, which states that every individual sooner or later senses his inferiorities, real or imagined, and tends to compensate for them. In general compensation refers to the tendency to make up for some weakness or deficiency in one trait by excelling in another one. The child who desires to excel in one physical activity and is blocked because of some physical weakness may compensate by putting forth special effort to excel in mental activity. Compensation may be carried on consciously and appear as either a direct attack on the problem or an attack through substituting another activity. Sublimation is a substituted reaction, which may be classified as a form of compensation. This involves those reactions, performed perhaps unconsciously or with no particular plan about the matter, by which the individual takes advantages of opportunities about him for satisfying a frustrated need or want. This represents a higher level of development and may be noted by the behavior of children as they grow toward maturity. The individual's desire for adventure may appear in the form of camp life, a theme at school, or some dramatic performance. The possibilities for sublimation will depend largely upon the opportunities offered by the child's environment and by the experiences of the child in meeting difficult situations. The weakness of this as a behavior mechanism stems largely from the fact that it is seldom based upon insight but depends upon the nature of the environmental stimulation and the child's past experiences in meeting frustrations.

Rationalization. Rationalization may be noted in the explanations commonly given by students for their failure to make good grades. In place of admitting an unwillingness to give an extra amount of time to his studies, the student may say that he wants to be an all-round guy, not a bookworm. The boy who is unable to take part in a music program may give as his reason that boys who take part in music are "sissies." This represents a sort of *sour-grapes mechanism*. Rationalization serves as a self-justification device. It oftentimes partakes of the nature of *evasion,* while at other times it may appear as a form of *egocentrism*.

A common form of rationalization is that observed in the behavior of the small child when he bumps his head or stumps his toe. In such a case he may place the blame on the physical object encountered rather than the self. This been termed *projection*. The school should discourage projection, since its effects are in general undesirable and do not lead to the actual solution of the problem encountered. Its effects may be noted in the case of the adult who blames his troubles on others, believes that various groups are constantly opposed to him, is suspicious of the actions and motives of others, and fails to recognize his own limitations.

Evasion. Through evasion the individual shields himself from having to face a difficulty or from the unpleasantness associated with frustrations and conflicts. *Suppression,* a form of forgetting, is one of the convenient forms of evasion. By this means the individual protects himself from the thought of an unpleasant experience associated with a frustration of some need or want. This is ordinarily done in an unconscious manner and becomes habitual through constant usage. The small child easily forgets to wash his hands before coming to the table at dinner time. The student easily forgets to prepare an unpleasant assignment. There is evidence from many sources that unpleasant experiences are forgotten to a greater degree than pleasant ones.

The form of evasion frequently found among preadolescents and adolescents is *daydreaming*. Many boys and girls, unsuccessful at school or at play, find refuge in a "dream world"—a world of fantasy. Lewin has referred to personalities as varying along a dimension of reality-irreality. The distinction between fact and fantasy is not always clear to the small child. With increased mental maturity and education the child becomes better able to distinguish fact from fantasy; however he may on many occasions find his dream world a more pleasant one than the real world. Through fantasy he is able to shape the world and the happenings according to his own liking. Mary's need for social acceptance which has been aggravated by the bad manners which she has developed may lead her into a world of fantasy whereby she finds herself very popular with her peers, or the winner in some contest.

A common form of fantasy which makes its appearance during preadolescence is *identification*. In this, the characteristics of some other person, real or imagined, are appropriated. This is a means of exalting the ego, since the individual through identification takes on some of the esteem which really belongs to the hero or the individual with whom he identifies the self. The exploits and successes of the hero give the individual additional stature which tends to exalt the self. Sometimes individuals identify themselves with inanimate objects such as airplanes, locomotives, or automobiles. The power and beauty of these objects give the boy who owns them (a form of identification) a feeling of satisfaction, even if they are but pictures pasted on the walls of his room. Any criticism of his objects of ownership is taken as personal.

The "sulkiness" or "pouting" of some children is an example of the escape mechanism practiced during the early years. One of the prime dangers involved in such behavior is that it may become the habitual mode of reacting to frustrations. Such methods are socially undesirable and ineffective in meeting and solving problems on the plane of reality. *Repression* is a form of escape in which the individual withdraws from the frustration as it exists and seeks to satisfy his needs in a more childlike manner. The crying of the grown-up girl and the childish mischief of the man are examples of the use of repression. The refusal of parents to let their children grow up, through the overprotection given them, is a most important factor contributing to the development of this form of behavior.

When the enjoyment of successful adjustment is more limited and more seldom than usual, there is a temptation either to recall formed adjustments and live them over again in memory, or to use the adjustment procedures over again that were successful on former occasions, whether they are now appropriate or not. This is called *regression.*

The old man who tells of the successful adjustments of his earlier years, or the woman who cries when her wants are thwarted, or the man who angrily strikes another who disagrees with him, or the boy who is homesick when he goes away to college, or the woman pretends she is ill when her husband refuses to buy her a new dress—these are examples or regression. Regression explains most of the infantile behavior of adults. When they face difficult adjustments, they simply regress to forms of behavior that worked when they were children.

Worry. Worry is perhaps the most common symptom of mental ill-health. Hicks [13] surveyed a group of 600 school teachers from all geographical sections of the United States, to find the frequency of symptoms of nervous instability. He found that worry ranked first. "Worry, disturbed sleep, shyness, indecision, absent-mindedness, fatigue, and headache were problems of greatest number."

The worrier is often emotionally unstable. His wants are beyond his capacity and then he is irritated because he cannot realize his ambitions. He becomes oversensitive. He worries about problems that should not concern him at all. He creates his own maladjustments.

Worry usually occurs when a person does not know how to make a successful adjustment. Therefore, it is an indication of ignorance. People do not worry about problems concerning which they have adequate knowledge. They may make continuous solution attempts, but they do not worry. The worrier does not try to solve his problems; he just talks about the fact that they exist. He continues to be irritated by his problems, yet he makes no attempt to reduce the irritation.

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[13] F. R. Hicks, *The Mental Health of Teachers* (Peabody College, Contributions to Education, Nashville, Tenn., 1943).

The rational approach. If one is to meet a frustrating situation successfully he must recognize it as a problem situation which calls for a rational approach. There are times when the individual may find that withdrawal is the best procedure to follow. The student of music may find that that his talent places a serious limitation upon his development, and thus reach a rational decision to spend his energies in pursuits where he can better succeed. Such an approach may be thought of as both an escape and compensation. It is questionable, however, whether there is anything to be gained from the use of rationalization, although it is universally used to help in softening the blows resulting from defeat or frustrations. The child should be guided in *facing reality* and accepting conditions as they are rather than as he would like for them to be. The child will be limited in his growth and the attainment of good mental health if he continues to practice self-deception, when faced with a difficulty. Children should be guided in the development of sound goals and values, and in the attainment of these.

The rational approach will demand that the individual know himself and know the situation with which he is confronted. Aggressiveness directed toward overcoming a difficulty when there is a good likelihood of success should be encouraged; while displaced aggressiveness based upon emotions should be discouraged. It is the function of education to help individuals solve their problems through the use of problem-solving techniques, which are discussed in Chapter 15. This means that infantile outbursts, intellectual evasions, aggression directed against others, and continuous daydreaming should be replaced with understandings, problem-solving techniques, self-restraint, self-evaluation, and the willingness to face reality in dealing with difficult situations. The challenge of the school is to direct the dynamic nature of the child in such a way that these outcomes will be the result.

MENTAL HEALTH

The significance of mental health. The first half of the present century has witnessed important developments in the general area of physical health. Remedies and preventive measures have been discovered for dealing with contagious diseases; the dread of pneumonia, once the number one killer, has well-nigh disappeared; infant mortality has been considerably reduced; the average span of life has been lengthened; and the ill-effects of a number of deteriorative diseases reduced. During this period social workers, teachers, and others concerned with child training have been made more conscious of the mental health problems of children. However, progress in the general area of mental health has not kept pace with that of physical health.

That there is a close relationship between physical and mental health has been recognized for many years. There are many studies which show that bodily limitations and malnutrition adversely affect the emotional stability of the growing child. Conversely, the mental attitude and emotional characteristics of the child will affect his physical well-being. The old Greek adage, "A sound mind in a sound body," is a truism with important implications for the education of the child.

The extent of maladjustments among school children has emphasized further the importance of mental hygiene. The responsibilities of the teacher in the development of well-adjusted personalities are enormous. Mental hygiene, which is concerned with the development of personally satisfying and socially acceptable behavior patterns, serves three major functions:

1. The preservation of good mental health
2. The prevention of the development of undesirable behavior patterns
3. The diagnosis and treatment of the basic causes of behavior disorders

Mental health and the home. One of the foremost objectives of the National Committee for Mental Hygiene is the prevention of mental illness. If this objective is to be realized, important considerations must be given to the child's home life and to preschool education. At this early age habits are not so completely formed, tradition is less fixed, and the growing child is very plastic. These early years may rightfully be referred to as the formative years. Their importance in personality development is clearly revealed in case studies of children and adults.

The most fundamental thing in the home situation, once the physical needs have been met, is the quality of the human relations and the completeness and continuity of the family contacts. This was clearly indicated in a study by Bankier in which 100 maladjusted boys with IQ's in excess of 100 who had been referred to Glasgow Child Guidance Clinic for other than educational problems were compared with a normally adjusted group of 100 boys with IQ's from 90 to 100.[14] Although nervous symptoms appeared more frequently among boys from normal home situations, more serious forms of behavior occurred more often among the boys from broken homes.

Mental hygiene and the school. The school is a focal point in the child's personal and social development. It has already been suggested that he faces new adjustment problems when he enters school for the first time. Furthermore, he faces new adjustment problems each year as he moves from grade to grade and from one teacher to another. The relationship that is established between the individual child and the teacher is of utmost importance in the promotion of good mental health. A healthy relationship between teacher and pupils furnishes a democratic atmosphere—an atmosphere in which children are free to express themselves but are guided by the goals and purposes inherent in the classroom situation. Clifford Adams questioned forty-two teachers from different schools about wholesome and unwholesome practices in their schools.[15] A study of the responses of these teachers revealed that many school practices were designed to deal with immediate situations, with little regard for basic factors responsible for specific behavior activities. Many practices were such as to lead to feelings of insecurity and inferiority on the part of the children concerned.

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[14] H. T. Bankier, "Boys of Normal and Supernormal Intelligence Referred for Clinical Treatment." Ed. B. Thesis (University of Glasgow, 1946).

It should be emphasized that the elementary-school child reacts to the classroom situation in terms of all that he has brought to school with him. This would include his hereditary characteristics, the home influences, health conditions, experiences with other children, and previous school experiences. Anything that adversely affects his mental life will have a harmful effect upon his emotional well-being. In a study of the dynamics of nine-year-old elementary-school boys Lantz found that experience with success resulted in better performance and better personal and social adjustments, while failure experiences caused poorer performance, increased tension, and inferior personal and social adjustments.[16] Some school situations that tend to produce unpleasant emotional reactions among elementary-school children are: interference with habitual self-expressive activities; failure in the performance of a school task; overly dominating attitude on the part of the teacher; strange or unfamiliar requirements or conditions for which the child is unprepared; being left out in activities that are pleasant or agreeable; being scolded by the teacher; lack of status with classmates; and other factors or conditions which would inhibit the satisfaction of fundamental needs.

Children cannot learn effective adjustment habits from adults who do not have effective adjustment habits themselves. Boynton compared the effects of a group of emotionally unstable teachers with that of a group of emotionally stable teachers on the pupils of their respective classrooms.[17]

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[15] Clifford R. Adams, "Classroom Practices and the Personality Adjustments of Children," *Understanding the Child,* Vol. 13 (1944), pp. 10-12.

[16] Beatrice Lantz, "Some Dynamics of Success and Failure," *Psychological Monographs,* Vol. 59 (1945), pp. 1-40.

[17] P. L. Boynton *et al.,* "The Emotional Stability of Teachers and Pupils," *Journal of Juvenile Research,* Vol. 28 (1934), pp. 223-232.

The fifth- and sixth-grade teachers of Nashville were given a modified form of the Woodworth-Mathews Personal Data Sheet and classified into quartiles according to their scores. The pupils of the adjusted teachers were given the same test and compared with the pupils of the unadjusted teachers. The results are shown in Table 10-2. The authors conclude that "if a teacher is of a hyperemotional type, she tends to disturb her pupils emotionally, but if she is emotionally stable she tends to bring about emotional stability among her pupils."

TABLE 10-2. *Differences in emotional stability of pupils in rooms of stable and unstable teachers*

	BOYS' MEDIANS	GIRLS' MEDIANS
Unstable teachers	15.33	18.75
Stable teachers	13.75	16.63
Difference in favor of stable teachers	1.58	2.12
Index of reliability	3.59	3.59

Importance of the emotional climate at school. There have been many improvements made in the physical facilities of the school. These improvements include better buildings, improved lighting, improved sanitation, school lunches, pupil transportation, and the like. These improvements have no doubt been beneficial; but the importance of good pupil-teacher relationships remain the same today as it was in the days of the one-room log school house. The type of human relations that exist within the school teaches the youngsters how to get along with each other. There is a striking tendency for children to respond in a fashion similar to that set by the leader. This is especially true for young children. In the *authoritarian* classroom the teacher assumes practically all of the responsibility for the activities of the group. Assignments, commands, rules, and the like are set forth according to her liking. Praise and criticism are passed out according to her feelings and desires. The pupils in such an atmosphere show tension and little co-operative behavior is to be found.

In the democratic classroom children have an opportunity to participate in planning and in making rules. The teacher serves as a guidance person, providing information when needed and offering suggestions which are designed for the promotion of individual achievement and group action. It has been observed that tension is reduced in such a classroom and co-operation encouraged. Teaching in such a climate is concerned with two kinds of problems that should be dealt with simultaneously: (1) guiding pupils in their personal growth and development, and (2) handling the group-process so as to promote co-operative behavior.

The type of school in which pupils can learn and develop as well-adjusted personalities will have certain characteristics, which might be referred to as a good emotional climate. Some of these have been listed as follows:

1. Desirable emotional content requires school to be a place where people have fun together.
2. Desirable emotional content requires that standards be within reach of pupils.
3. Desirable emotional content requires that boys and girls feel wanted.
4. Desirable emotional content requires that the teacher be an adult friend.[18]

Therapeutic values of creative activities. Creative activities furnish the child opportunities for experimentation, self-expression, and release of tensions. On the construction of a train and railroad the child is able to gain satisfaction through self-expression and exploitation of things only partially understood. The child's attempt at the solution of some conflict resulting from frustration or the lack of fulfillment of some basic need is likely to be satisfactorily resolved, if he is permitted to express himself in some area of creativeness. A need for "belongingness" may be reasonably satisfied through play activities in which make-believe characters are introduced, or through painting or construction where people and things from his environment are developed. Likewise, the adult who has a wide range of interests will be able to find release from tension through the free expression which certain interests permit. Concerning the therapeutic value to be derived from creative activities, Henry has stated:

> In an impersonal world of paints and blocks and make-believe, experimentation with mixed-up feelings of love and resentment can go on safely—safely for the adults, in that the child does not actually act out his resentments; and safely for the child, in that the playing out does not arouse the retribution of the outside world, nor arouse his own guilt of having feelings of which his parents disapprove. This very explanation also helps the child recognize and express his feelings. Many of his hostile feelings tend to disappear once he has acted them out in his creative products.[19]

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[18] K. Wiles and M. Beauchamp, "How Can a School Provide a Good Emotional Climate," *National Education Association Journal*, Vol. 40 (1951), pp. 462-463.

[19] W. E. Henry, "The Child Tells about Himself through His Creative Products," *Fostering Mental Health in Our Schools*. Yearbook of the Association for Supervision and Curriculum Development (1950), p. 258.

SUMMARY AND EDUCATIONAL IMPLICATIONS

Life has been described as a continuous process of change and adjustment. The newborn infant is faced with many adjustment problems as he emerges from the sheltered life within the mother to an expanded social and physical environment. As he emerges from the stage of infancy, new problems arise and additional needs and wants appear. His first adjustments are concerned with life activities in his home environment. These early home adjustments are extremely important in connection with later adjustments. As he grows and develops his world becomes enlarged, his needs and wants increase in number, and he is faced with problems of adjusting to conditions and people beyond his immediate home environment.

One cannot prescribe a "magic formula" for helping children make socially acceptable adjustments. In the first place each child is faced with his own unique problems. Also, boys and girls differ widely in their varied potentialities. However, teachers and others concerned with child and adolescent behavior should have some standards or criteria by means of which they evaluate the adjustments of the individual child to problems which he encounters.[20] Such criteria should include:

1. *Satisfaction of original goal.* Does the behavior aid the child in satisfying the original goal or an adequate substitute?
2. *Social status with peers.* Does the behavior enable the child to maintain status with his classmates or peers?
3. *Socially acceptable.* Is the behavior in harmony with the general mores and cultural patterns of the home, school, church, and various community forces?
4. *Effective methods of meeting problems.* Will the habits thus established enable the child to meet more effectively future problems?

Good mental hygiene should begin in the home during the period of infancy. The family should provide affection and security for the child. When these are not provided in the home the problems of the school in dealing with the child become very difficult. The school should provide the child with an environment and opportunities for wholesome growth and development. This can only be done when careful consideration is given to the abilities and needs of each individual child. Children need to succeed. A school program that places standards above the needs of the pupils will not function effectively in the development of well-adjusted personalities.

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[20] See Louis P. Thorpe, *Child Psychology and Development* (New York: The Ronald Press Co., 1946), p. 712.

The influence of the elementary-school teacher is of major importance in the guidance of growing boys and girls. Also, the responsibilities of secondary-school teachers are most important in this connection. Adolescents are faced with many problems and difficulties with which they need help. Some of these needs and problems will be referred to in later chapters.

Questions and Exercises

1. What are some of the outstanding features of a home situation which tends to provide for good personality adjustment among children of the home?
2. What are some personal relations between the teacher and pupils which are conducive to good mental health?
3. Tom has a very bad temper. His mother says that he inherited this temper from her, and that nothing can be done about it. Comment on this.
4. Jane is a fourth-grade pupil, and is very shy. Her teacher says that there is little need for any concern about this, since she will outgrow it. Comment on this assertion.
5. Continuous daydreaming is a good indication of personal inadequacy. Explain.
6. A teacher commented, "The mental health of the pupil is not my concern, since most mental hygiene problems originate in the home." Give your reactions to this statement.
7. What are some of the major adjustment problems the child faces when he first enters school?
8. What is meant by learning to face *reality?* Why do people often avoid facing reality?
9. Give illustrations to show how the elementary-school child may be helped in meeting frustrating situations.
10. The volume by Ruth Benedict, *The Chrysanthemum and the Sword: Patterns of Japanese Culture* (Houghton, Mifflin Company, 1946), provides splendid material for a report on the effect of early cultural influences upon personality development. Read it and comment on it.
11. Give an illustration from your own experiences of the use of rationalization. Is this desirable or undesirable? Give reasons for your answer.

Recommended Readings

Fenton, Norman, *Mental Hygiene in School Practice* (Stanford University: Stanford University Press, 1943).

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Symonds, P. M., *The Dynamics of Human Adjustment* (New York: Appleton-Century-Crofts, 1946).

Trow, William C., *Educational Psychology*, 2nd ed. (New York: Houghton, Mifflin Co., 1950), Chap. XVII.

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PART II

Learning and Guidance

CHAPTER 11

The General Nature of Learning

IN THE FOREGOING CHAPTERS there has been an attempt to present a description of child growth and development, together with factors affecting various aspects of growth toward maturity. Certain aspects of growth—height, weight, and skeletal changes—are classified as physical growth. Others are classified as emotional, social, and mental growth. Growth in character, personality, interests, attitudes, and values are also described. The modern school is concerned with all these phases of the child's development, recognizing that the child develops as a unitary whole. Too often the conventional school limits its efforts to growth in those educational skills and abilities represented in the different school subjects.

THE MEANING OF LEARNING

The importance of learning in daily life becomes apparent when we consider what a man would be like if he were deprived of all he had learned. Learning begins during infancy and the child of two or three years of age has learned to hop, skip, talk, eat with a spoon, drink from a cup, and many other aspects of his cultural heritage. Without this learning he would be largely a creature with normal reflexes controlled by his physiological needs.

As a result of research studies in the general area of educational psychology our knowledge about learning and the teaching process has undergone profound changes during the past thirty years. The materials of this and subsequent chapters are based upon the results from these studies.

What is learning? Many definitions of learning have been given from time to time. As viewed by some teachers learning applies primarily to academic growth or growth in the ability to perform the various school tasks, including growth in the acquisition of knowledge. Such a description of learning is too narrow. Growth in reading ability and in arithmetical skills are examples of learning. The early emotional and social conditioning of the child, referred to in Chapters 4 and 7, are examples of learning which appear during the first year of life. Then, there are examples of learning to be found in the applications of knowledge to the building of roads and bridges, to the teaching of growing boys and girls. The child learns to roller skate, the musician learns to play a musical instrument, the man learns to lay bricks, and the housewife learns to cook and sew.

There are types of learning which are more subtle in nature than those already listed, such as those involved in creative writing, specialized interests, attitudes toward other people, and appreciation for some of the things about us. A definition of learning that would include these broader aspects must be somewhat general in nature. *Learning may be defined as the process whereby, as a result of experience, some changes or modifications in patterns of adjustment occur.* A logical description of the product of learning would suggest that the learner, following the learning period, reacts differently to certain aspects of his environment. Thus, what was not formerly probable, now, because of learning, becomes probable. For example, the response of the first-grade child to an element present in a new experience such as a "pond" which was not probable before the experience has now become probable. Thus, when the word "pond" is spoken the response involves that of the image of a body of water that was observed in the initial learning experience.

The learning curves. One of the striking characteristics that may be observed from experiments on learning is the marked changes in behavior which often occur in a relatively short period of time. Learning curves have been constructed in an effort to show the nature and amount of such changes. The nature of learning curves has been a subject of special interest for over half a century. These studies reveal that there is no typical curve for all types of learning. Furthermore, those who describe learning in terms of habit patterns have emphasized that progress shown on learning curves is piecemeal in nature. The question may be raised: "Just when has the child learned to roller skate?" When he can stand erect on the skates? When he is able to move forward on the skates? When he is able to cross barriers on his skates? When he can move about on his skates without giving attention to the performance?

Another problem encountered in the interpretation of learning from scores plotted in the development of a learning curve arises from the unit of measurement used. It has constantly been observed that in the learning of golf the learner is able to improve his score considerably during the early learning periods, but after he has reached a certain point, any improvement in his score is likely to be very small. However, one cannot say that each unit of improvement noted on the learning curve is of equal difficulty.

In the complex types of learning, where the learner's attention can be readily shifted to different parts of the learning task, important irregularities appear in the curve of progress. This is illustrated in the learning curves of Figure 11-1, based on Bryan and Harter's classic study of learning the telegraphic language.[1]

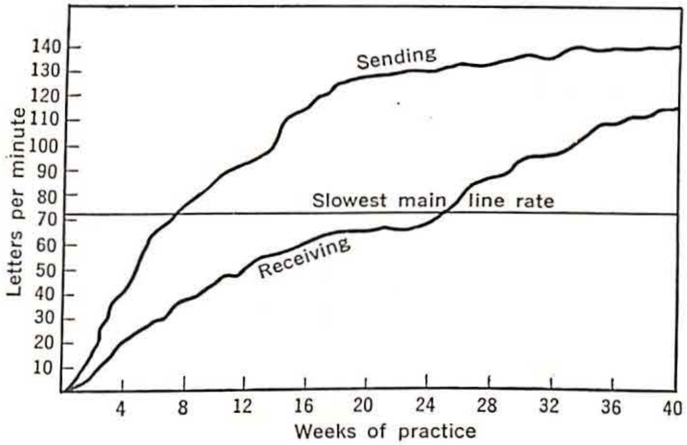

FIGURE 11-1. The learning curve for telegraphy

The *Receiving* curve shows a plateau, while the *Sending* curve does not

PLATEAUS. Many learning curves show periods of arrested progress followed by further learning. This arrested progress is noted on the learning curve by a horizonal line, and was formerly interpreted as a period during which little or no improvement was made. An understanding of the nature of these plateaus and of the factors causing them has been the aim of a number of studies. Kao's studies indicate that if the learner deals with the performance as a whole or unit, he tends to progress steadily without the appearance of a plateau.[2] These plateaus in the learning curve are a result of certain factors or conditions related to the learning process or to the nature of the units used in plotting such curves. Changing methods of overanxiety and tension on the part of the learner, shift of attention to other aspects of the task or completely away from the learning task, inferior method of performing the task, and loss of interest are additional factors which may contribute to the appearance of plateaus.

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[1] W. L. Bryan and N. Harter, "Studies in the Psychology and Physiology of the Telegraphic Language," *Psychological Review*, Vol. 4 (1897), pp. 37-55.

[2] D. L. Kao, "Plateaus and the Curve of Learning in Motor Skill," *Psychological Monographs*, Vol. 49 (1937), No. 219.

There is much evidence that lack of motivation or loss of interest leads to little or no progress in learning and thus a plateau in the learning curve. Those concerned with the guidance of the learner should concern themselves with the cause or causes of loss of interest or boredom. The elementary-school child faced with long periods of reading loses interest in the reading activities or becomes discouraged. It is well known that loss of interest or boredom may be observed in the ordinary typing class after a period of thirty or more minutes of practice. Thus, plateaus in learning should be looked upon as results, and the teacher should be especially concerned with their causes. The introduction of rest periods, variation in the nature of the tasks, increased interest in the task, and keeping the end goal in mind are means which have been found useful in reducing learning plateaus.

FINAL LIMIT. This final limit of learning is represented by the plateau at the end of the learning curve. In many cases it results from the same factors that produced the other plateaus of the learning curve and does not represent the real physiological limit. In fact it is very difficult to determine just when the true physiological limit has been reached. The physiological limit may be regarded in four different ways. In the first place there is the *practical* physiological limit. This is associated with many industrial tasks. The worker reaches a plateau in the learning skill which is sufficiently effective for the performance of the job. The carpenter reaches a plateau in the quality of work involved in hanging doors which passes the inspection of his supervisor. The *motivational* physiological limit operates from the early stages of life. This may be observed in the work of the student when he reaches his goal or aspirations. If the grade of C, which is a passing grade, satisfies his aspirations, he doesn't strive for better grades and thus fails to reach a higher level of performance. Again, the physiological limit may be thought of in terms of *methods of work*. If, for example, a learner reaches a limit by one method, he may find that, after considerable practice with a better method, improvement will result. Therefore, it seems likely that a learner may approximate a physiological limit, dependent in part upon the method of work employed.

Essential elements in a learning situation. Contemporary learning theorists seem to agree upon the meaning of learning. They are, furthermore, generally in agreement upon the variables that must be considered in any theory of how learning takes place. They recognize two general elements in any learning situation: (1) the state or condition of the learner at the time, and (2) the particular situation with which he (the learner) is confronted. During the early part of the present century considerable emphasis was placed upon the neurophysiology of learning. Theoretical explanations for learning were presented based upon a structural analysis of the central nervous system. However, Thorndike, who was responsible for the formulation of learning principles based upon theoretical explanations of the neurology of learning, has pointed out:

> We cannot observe or infer what goes on in the brain in even so simple a case as when hearing "Come here" causes him (man) to approach and hearing "Go away" causes him to depart. What we observe are the probabilities of the occurrence of certain acts, thoughts, and feelings, as consequences of certain hearings, seeings, and thinking of words in certain contexts.[3]

The importance of the learner as a dynamic force in the learning situation is recognized by the educational psychologist. Learning is not a passive process, but takes place in proportion to the extent that the learner is actively directed toward a goal or the solution of a problem. Needless to say there are many characteristics of a learner which affect the efficiency of his learning; but none of these are as basic to learning as the dynamic nature of the individual learner. This, and the importance of a favorable learning situation, will be given special attention throughout our discussions of the learning process. However, psychologists are not in agreement about the manner in which these factors produce changes which we have referred to as learning. The various theories proposed by different students of psychology will not be presented here, since our prime purpose, in this and in the subsequent chapters dealing with the learning process, is to present materials from scientific studies along with certain essential theoretical considerations which will enable those concerned with directing the learning activities of others to do their task more economically and more effectively than they would do otherwise.

Learning and maturation. The importance of maturation in the development of the individual child was emphasized in Chapter 2. In theory, one can distinguish development as a result of learning from that resulting from maturation on the basis of changes which occur from experience rather than inner growth. However, in actuality, all forms of development depend to some extent upon inner growth or maturation and in part upon activity. Under activity is included all that an individual does, thinks, and feels, whether initiated by himself, the stimulation of his classmates, or the guidance of his teacher. The teacher, however, is primarily concerned with complex patterns of behavior such as those involved in walking, reciting, playing the piano, and the like. All of these abilities have as their basis a unity of organization which developed from years of maturation, a variety of experiences and guidance, and many related activities. Thus it is impossible to determine the exact contribution of inherent forces and experiences in the development of these behavior patterns.

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[3] E. L. Thorndike, "The Psychology of Semantics," *American Journal of Psychology*, Vol. 59 (1946), pp. 613-639.

The effectiveness of an experience depends largely upon the stage of the learner's development. For example, in the case of learning to read, instruction on the part of the teacher is not likely to be effective if the child has not reached a stage readiness for such learning. Readiness for the learning of almost any skill or concept is a complex of many elements. Lack of readiness for reading is the result of such factors as small vocabulary, lack of experiences with written materials, lack of experiences in comprehending thought units, visual difficulties, poor phonetic discrimination, or immaturity. To say that the teacher must take into consideration a child's readiness for learning certain materials means that she must take into account his stage of development, interests, and other factors which will affect his initial learning.

THEORETICAL CONSIDERATIONS

The study of learning has been, probably with the exception of studies of perception, the most active field of investigation in experimental psychology. It had its active beginning with Ebbinghaus in 1885; following which much interest was manifested in the characteristics of the learning curve. Thorndike and others were quick to follow with studies out of which developed theoretical explanations of learning. A satisfactory explanation which harmonizes with all that has been discovered about learning has not yet been formulated. The various theories presented tend to represent the particular investigator's point of view growing out of studies of some aspect of the total learning patterns and situation in which it occurred. Some are interested in the initial aspects of learning, others are interested in problems related to improvement, others are interested in transfer and generalizations, while others are interested in the dynamics or motivational aspects. These varied interests and approaches to the problem of learning will be revealed in the subsequent discussions of certain theoretical considerations.

Learning among lower animals. One of the earliest methods of studying learning made use of animals. It was found that by using animals conditions could be better controlled and the problems more readily studied, under laboratory conditions, than by using human beings as subjects. The ability to learn appears far down in the scale of life. H. S. Jennings pointed out as early as 1906 that even the protozoa are able to modify their behavior so as to get out of unfavorable regions of stimulation or to remain in favorable ones.[4] They do so by a type of behavior usually referred to as *trial and error*, not different, in principle at least, from learning processes found among higher forms of life, including man. The meaning of trial and error is illustrated by the behavior of a rat when placed in a maze. The rat proceeds to move along a path in an attempt to get out of the maze. He enters many blind alleys, he retraces his movements, and finally reaches the goal. The words "trial and error" are derived from the fact that the goal was reached by series of trials (attempts), and that errors (wrong moves or failures) were made before the goal was finally reached. It has been suggested that the words "trial and success" better describe this learning process.

The method of *conditioning,* referred to in Chapter 4, has been widely used in the study of both animal and human learning. Learning as a result of conditioning can be thought of as associational learning in that when two or more stimuli are presented in close succession, any one of these stimuli eventually can elicit the original response. One of the most important elements of the conditioned response is its anticipatory character. As conditioning proceeds the subject comes to anticipate the response to the conditioned stimulus. The conditioning process occurs, then, when behavior responses are established which follow particular cues. It will be noted that conditioning is a form of habit formation.

The word *reinforcement* appeared in connection with experimental studies of conditioning. If a pet dog that has been taught to bark in response to a given signal is fed immediately after he barks, the response (barking at the given signal) is strengthened. This feeding of the dog is viewed as increasing the strength of the connection between the stimulus (signal) and the response (barking) and is referred to as reinforcement. Conditioned responses occur in classroom situations, whether or not the teacher has planned for them. In a teaching situation one should not lose sight of the original stimulus and the desired outcome. The development of literature appreciation, a desired goal in high-school English, will not result in a classroom situation where threats and sarcasm are used as stimuli. Neither will this occur when the goal of a particular grade or some extrinsic reward is substituted for the desired goal of appreciation.

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[4] H. S. Jennings, *Behavior of the Lower Organism* (New York: Columbia University Press, 1906).

Relationship of trial and error and conditioning. Many educational psychologists no longer make a clear-cut distinction between trial and error learning and conditioning so far as the basic principles are concerned. The basic principles are very much alike, but there is an important difference in the arrangement of the learning activities. The conditioned response depends upon reinforcement while trial and error depends upon reward.

Hilgard and Marquis have referred to two kinds of conditioning: *classical* and *instrumental*.[5] Classical conditioning involves the conditioned reflex as revealed by Pavlov's experiments. In this case the conditioned stimulus is a substitute stimulus, which after reinforcement arouses a response which it formally did not arouse. Instrumental conditioning is so named because the response learned is an instrument for the satisfaction of a need. This is a form of trial and error learning. The fact that this may be regarded as a form of conditioning indicates that classical conditioning and trial and error involve the same basic principle.

Both the trial and error theorists and the conditioned response theorists emphasize association as the basis for learning. This interpretation stems from Thorndike's studies of animals in which he described learning in terms of bonds established within the organism between the stimulus and response. The association theories tend to consider wholes in terms of the parts of which they are composed. Complex habits involve many simpler habits, "bonds" or conditioned responses.

Insight in learning. The Gestalt or field theory of learning, advanced by Koffka in 1924, makes use of insight as a basic principle. The Gestaltists explain learning in terms of modifications that take place in response to meaningful patterns or configurations. According to Koehler when the learner is confronted with a new problem he draws upon the patterns of his past experiences to help him understand the new situation.[6] Learning takes place through reorganizing old terms so as to grasp significant relationships in the new problem. When these relationships are perceived the learner is said to have achieved *insight* into the problem.

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[5] E. R. Hilgard and D. G. Marquis, *Conditioning and Learning* (New York: Appleton-Century-Crofts, Inc., 1941).

[6] Wolfgang Koehler, *Gestalt Psychology* (New York: Liveright Publishing Corporation, 1947), p. 267.

Perhaps the most commonly used criterion for the presence of insight in problem-solving is that of the suddenness of the solution. Yet, there is good evidence that insights often appear suddenly or for only one phase of a particular problem. A boy confronted with the problem of constructing a dog house may study certain details, bring to bear his observations of other dog houses, and gather useful information from the library. All of these experiences are beneficial to the appearance of insight into the problem. Furthermore, he may grasp the solution of how to construct the door or some other part of the dog house before he comprehends completely the pattern for the entire structure. Thus it appears that the individual may have partial insight into a problem; although learning is not complete until some solution to such a problem has been reached which satisfies the goal of the learner.

Learning as habit formation and understanding. It will be observed from a study of the different theories of learning that two main approaches have been made to the explanation of learning: habit formation and understanding. There are some who would divide learning into various kinds, while others conceive of all learning following the same basic principles. The disagreements among psychologists concerning how learning occurs takes place primarily at the abstract level. These controversies, although important for the progress of science, are too abstract and complex to present in detail to the beginning student of educational psychology. There is, however, an area of common ground, based upon results from carefully controlled experiments, which will give the student a good understanding of the general nature of learning, factors and conditions that make for efficiency in learning and retention, fundamental principles of transfer, and effective methods of study. Information, applications, and generalizations based on these studies will be presented in this and subsequent chapters on different aspects of learning.

It appears that there are variations or gradients in learning running from learning that is primarily blind trial and error to a creative attack on a problem for which there is no ready-made solution. It is within this realm that the various theories or explanations of learning have operated. There are some who, like Carr and McGeoch, would treat problem-solving and reasoning as trial and error learning involving symbols. An alternative to this is to regard problem-solving in terms of bringing together possible responses from many experiences and organizing them so as to solve the problem. This is the position of Hull who recognized that there are characteristics in problem-solving that are different from those in trial and error learning. Closely allied to this viewpoint is one by Maier, who distinguishes reasoning from other types of learning. *Understanding* rather than *habit formation* is emphasized in this theory.

Learning as reorganization. Learning as a reorganization of experiences has two aspects, one dealing with the transformation which produces the new patterns and the other with the stabilization and consolidation of this new organization. The latter phase is one of *fixation* and *precision,* while the former is one of *differentiation* and *integration.*

When the baby learns to distinguish his mother from others, and reacts to her differently from others, differentiation may be said to have occurred. At a later stage the growing child learns to distinguish a school from a church, the chair in the house from the couch, and the house from the garage. It was pointed out earlier that the responses of the infant child are diffuse and undifferentiated in nature. Differentiation may be thought of as an essential stage in learning. Differentiation may also be thought of as the process whereby a feature or detail of an original pattern emerges to become a new or particularized pattern. Through differentiation the student of botany is able to identify different types of plant life which fall within a large classification. It is important for the teacher to realize that undifferentiated behavior occurs during the early stages of the learning process, and that differentiation develops as a result of guidance and experience.

Integration is the process whereby more or less discretely perceived things or actions become more closely related or organized into a new meaningful pattern. For example, when one learns to type he organizes the movements of the fingers into a new structural pattern of movements. Also, when the child learns to read the sentence, "I have a pet dog," there is integration taking place in which the various letters and words making up the sentence are brought together into the newly perceived pattern. The teacher should realize that much of learning involves continuous integration of less organized elements into larger and better organized response patterns. This process cannot be explained merely by the mechanical influence of repetition. It appears rather that through successful reactions there is a change in the tension system which was created through certain conditions, needs, or goals. These tension-reducing reactions produced by the successful performance of the act are linked up with integration, fixation, and retention.

Learning and generalization. If materials learned could only be used in the manner in which they were originally learned, the effects of learning would be seriously limited. Very early in life the child is able to apply percepts or cues learned in one situation to an interpretation of another situation. He learns that the kittens follow the mother cat around. He may ask when he sees the dog where the puppies are. This process of applying

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Learning takes place best in a favorable environmental situation where pupils are properly stimulated and not inhibited by a formal and authoritarian classroom atmosphere

a particular response pattern to other situations for which the behavior pattern is appropriate has been termed *generalization*. Most of the things learned in school are of value to the learner to the extent that they are generalized. If the child is unable to generalize the response pattern that $2 + 4 = 6$ to situations outside the classroom and books, the ability acquired in arithmetic would be fruitless. The process of generalization may be noted in connection with all learning including ideas, skills, attitudes, appreciations, and problem-solving.

CONDITIONS AFFECTING LEARNING

Motive the basis of learning. Motive is not related to learning merely as a facilitating or inhibiting force or condition. Neither is motive something which can be introduced apart from the needs and characteristics of the learner. Motive is indispensable to learning. It represents the antecedent, dynamic background for both original behavior and its modification. The relationship between certain needs and specific types of behavior among animals is well known. The hungry rat is more active than the well-fed one. It is easier to teach a hungry rat than a well-fed one to find its way through a maze to a food box. However, there are many other drives besides hunger that produce activity. These drives are basic to all human activity and are essential for learning. The application of motivation to learning in school will be given special consideration in Chapter 12.

Learning by imitation. Human beings learn a great deal from observing the activities of others and attempting to copy them. This has been described as learning through imitation. For such learning to occur the learner must first learn to imitate, and if the attempt to copy a performance is to be effective, it must utilize habits already established.

A splendid experiment illustrating learning by imitation was conducted with 42 first-grade children as subjects.[7] Two children were placed in a room where there were two boxes, as shown in Figure 11-2. One child (the leader) was told which of the two boxes to open in order to secure a piece of candy. Only one of two pieces of candy in the box was to be taken by him. The second child (imitator) was rewarded with the second piece of candy, if he opened the same box as the first child opened. Both children stood at the place marked "start" in Figure 11-2. The position of the candy varied in random order from one box to the other. Only 20 per cent of the children imitated on the first trial, but after an average of three trials the second child copied the performance of the first child. When the situation was changed, so that four boxes were used, 75 per

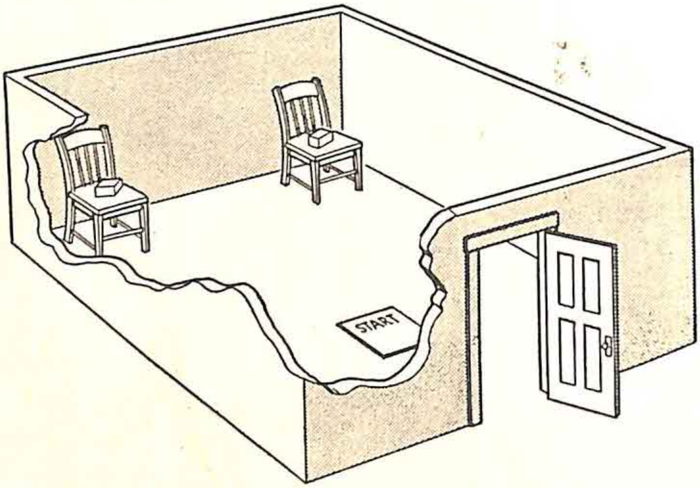

FIGURE 11-2. The situation used to teach children to imitate

cent of the children imitated on the first trial. This demonstrated that these children generalized in this rather simple situation. In another aspect of this study children were taught not to imitate, through being rewarded for not doing what the leader did.

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[7] N. Miller and J. Dollard, *Social Learning and Imitation* (New Haven: Yale University Press, 1941), p. 124.

The results of these studies reveal that children can be taught to imitate certain responses when the basic principles of learning and motivation are followed. However, these children already had within their responses repertoire the essential basis activities. They could walk to the box, open it, and lift out the candy. This may appear obvious; however when applied to more complex situations the same basic principles operate. The child is not able to repair a radio through observing these responses in an adult. Complex skills, such as riding a bicycle, involve the acquisition of habits for the individual who has not acquired this skill. The learning of such skills will require a longer period of time and appears to make use of both trial and error and insight.

Effects of practice upon learning. At one time, frequency was set forth as the central factor in learning. Although Thorndike early proclaimed this as an explanation of learning, at a later date, under the influence of an avalanche of studies, he refuted this explanation. There are perhaps many teachers who still look to repetition as a means of teaching and learning. While repetition alone does not seem to affect the learning of new responses, it is a means by which certain conditions appear persistently and these conditions, closely related to the learning process, are responsible for learning.

The importance of goals has been emphasized by recent students of learning. It has already been suggested that learning is an active process whereby the responses of the organism are directed toward certain goals. The attainment of these goals is satisfying to the organism and produces a relief from the tension involved in the efforts to reach the goal. Thus learning involves attentive responses directed towards certain goals. A repetition of this persistent attention directed towards certain goals is important in learning. However, the repetition of the response alone is not important. This may be observed when one blindly repeats, with little attention to the items involved, some creed. There are many individuals who have read some religious creed hundreds of times and are still unable to recite it from memory. Additional experimental studies by Thorndike led to a reformulation of his earlier concepts relative to the strengthening and weakening of behavior patterns. In 1935 he wrote:

> States of affairs which are annoying to the animal . . . stimulate him to do whatever his repertory provides as responses to the annoyance in question.

> His repertory does not provide a destructive or weakening reaction . . . which subtracts from the connection upon which it acts. Any apparent subtraction is due to the increased strength of competing tendencies. The annoyer does not then and there destroy or weaken the connections of which it is the after effect, but only causes the animal to make a different response to the *S* in question.[8]

Distribution of practice. The proper spacing of practice in learning has received the attention of a number of students of educational psychology. The question involved is: Is it better to practice a task without interruptions, or are frequent rest intervals beneficial to learning and retention. In general, different studies bearing on this problem indicate that some distribution is better than no distribution.

The optimal distribution of practice is not an absolute matter which can be expressed in so many trials daily; rather, the greatest efficiency may occur from an interruption of practice when the setting up of undesirable habits appears to retard progress or when the subject is no longer giving careful attention to the performance of the problem. Thus, the specific effect of a certain distribution of practice will vary with the learning task

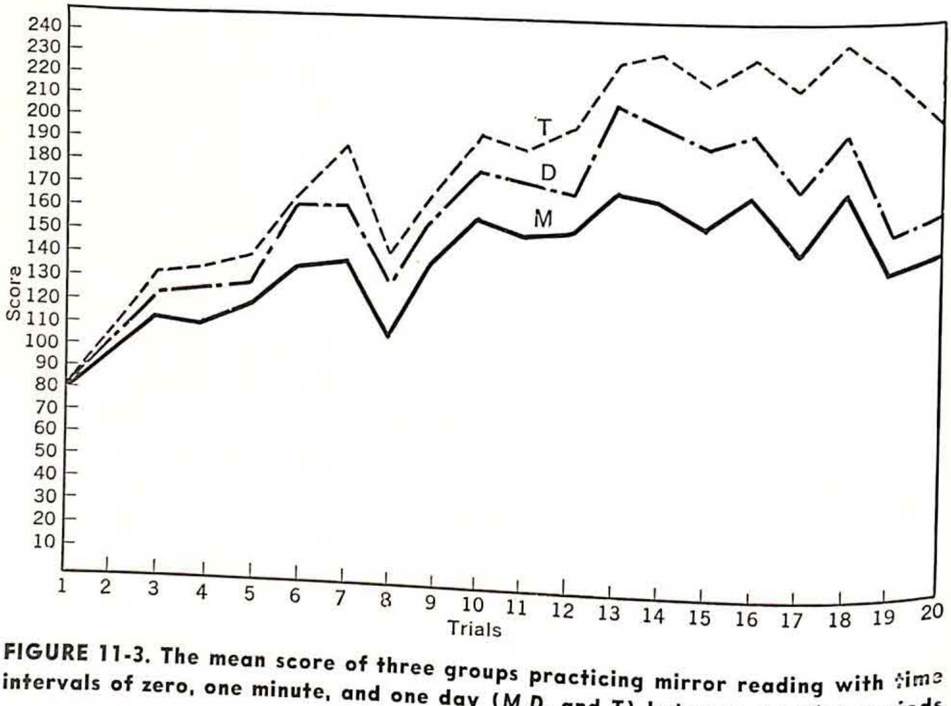

FIGURE 11-3. The mean score of three groups practicing mirror reading with time intervals of zero, one minute, and one day (*M*,*D*, and *T*) between practice periods

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[8] E. L. Thorndike, *The Psychology of Wants, Interests and Attitudes* (New York: D. Appleton-Century Co., Inc., 1935), p. 42.

involved. Lorge, using as learning tasks mirror drawing, mirror reading, and code substitution, compared the effects of massed practice, consisting of twenty trials, with the effects of practice in which a rest period of one minute and a rest period of one day intervened between each trial.[9] Improvement in learning mirror reading was measured in terms of speed of reading correctly materials projected into a mirror. The results of this learning task are presented in Figure 11-3.

A study of these learning curves shows a superiority for the groups with a rest period between each trial. This superiority tended to increase after each trial. The superiority for the greater time interval of one day is significantly greater than that for the time interval of one minute. This along with other experiments conducted by Lorge appears to substantiate the theory that learning under the condition of distribution is more efficient than under the condition of massing. However, several cautions should be observed before too wide generalizations are made from these and somewhat similar findings. There is a time interval beyond which there is no increased efficiency. Again, the efficiency of a particular distribution of practice is conditioned by the maturity of the learner. It seems likely that both too long work periods and too long rest intervals, alike, may adversely affect the learning of immature learners. Also, the length of time interval should vary with the nature of the materials being learned and the stage of the learning. On a complex problem the early practice periods should be of longer duration, with the length of the time interval increasing as the learning progresses. The superiority of the distributed practice periods over massed learning lies mainly in the retention of the materials learned. The increased time seems to permit certain learning parts to become better organized into a behavior pattern, making for greater efficiency in learning and retention.

Three important variables are involved in the distribution of practice. These are (1) the length of the practice period, (2) the length of the rest period, and (3) the manner in which the rest period is used. Laboratory experiments have usually dealt with rote learning tasks or with the acquisition of simple skills, such as that involved in target throwing. One would not likely find the results of such studies applicable to learning to type or to play the piano. One investigator found that, in memorizing piano music, distributed practice was helpful to the poorer students but showed no particular advantage for the better students.[10] Menefee noted that a class in sociology meeting two hours a day for a single quarter learned more than a class meeting one hour per day for two quarters.[11] It seems that most of the advantage of distributed practice lies in some distribution over none; however the length of the work period should vary directly in relation to the complexity of the materials and the maturity of the learners.

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[9] I. Lorge, *The Influence of Regularly Interpolated Time Intervals upon Subsequent Learning* (Contributions to Education, Teachers College, Columbia University, 1930), No. 438.

Whole and part methods. The whole method of learning has been set off as a type of learning in contrast to the part method. That this notion is not wholly accurate may be observed from a careful consideration of what constitutes the *whole*. This is a relative term. The whole might be an entire book; it might be an arithmetic problem; it might be a sentence to be analyzed and studied for its meaning; or it might be a poem to be memorized. A sound principle to consider in studying this problem is that there is no one size of a unit that makes up the whole. The whole should be regarded in terms of the ability, experiences, and maturation of the learner.

In any case learning by whole refers to considering the entire unit each time. Thus, in learning a poem, the learner would study through the entire poem each time, rather than learn one line or sentence before going on to the next line or sentence. No clear-cut results have been obtained from comparisons of these methods of learning. Most people tend to use the part method in learning. There is some evidence that for certain types of learning the greatest improvement takes place with practice of the whole method. However, the superiority of one method over the other will be conditioned by such variables as: (1) the nature of the materials being learned, (2) the intelligence of the learner, (3) the maturity of the learner, and (4) the learning habits which characterize the learner.

Ten experiments on whole and part learning were reported by Jensen and Lemaire.[12] Six of these dealt with the memorization of poetry, two with chemical information, and two with directions about typewriting. The averages for the whole method of learning were higher in all six of the experiments involving poetry. No significant differences appeared for the typewriting learnings, while the whole method was superior with one group and the part method with the other group memorizing chemical information. The investigators conclude: "Where either method of memorizing is prescribed, or where the child is left to choose his own method, a significantly large percentage will be handicapped." Thus, it appears that no simple formula can be set forth which gives the percentage of superiority of one method over the other.

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[10] Grace Rubin-Rabson, "Studies in the Psychology of Memorizing Piano Music: II. A Comparison of Massed and Distributed Practice," *Journal of Educational Psychology*, Vol. 31 (1940), pp. 270-284.

[11] S. C. Menefee, "Distribution of Effort in Studying Sociology," *School and Society*, Vol. 48 (1938), pp. 243-245.

[12] M. B. Jensen and Agnes Lemaire, "Ten Experiments on Whole and Part Learning," *Journal of Educational Psychology*, Vol. 28 (1937), pp. 37-51.

RETENTION

Studying retention. The studies of Ebbinghaus are important not only because they represent the earliest published studies in the general field of learning, but also because they present materials bearing on the nature of forgetting. He constructed and used for the first time nonsense materials in a learning situation. His results showed that after a one-hour interval following the initial learning it required 45 per cent as much time to relearn lists of nonsense syllables to one correct reproduction as in the original learning. After an interval of twenty-five hours it required 79 per cent as much time to relearn the syllables. Thereafter the increase in the amount of time required to relearn the syllables increased progressively slower with an increase in the time interval. The implications of this study to problems of learning are most important. However, the rate of forgetting is a result of a number of factors, some of which will be presented in the subsequent discussions.[13]

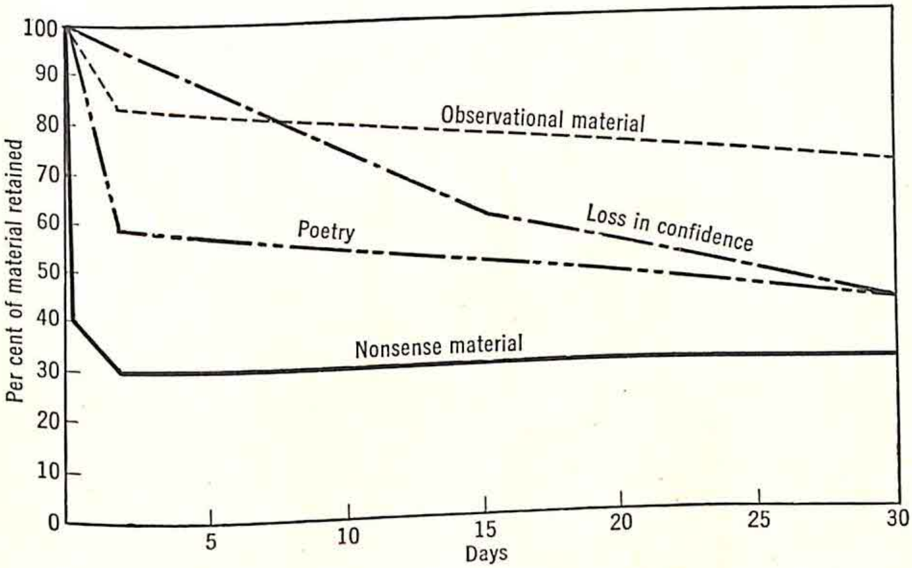

FIGURE 11-4. Typical rates of forgetting different kinds of material

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[13] A. R. Gilliland, "The Rate of Forgetting," *Journal of Educational Psychology*, Vol. 31 (1948), pp. 19-26. Some factors presented in the following discussions are based on the items presented by Gilliland.

The nature of the curve of forgetting is shown in the hypothetical curves of Figure 11-4. It will be noted that the rate of forgetting is rather rapid at first, with a gradual falling off thereafter. The nature of the forgetting curve will vary considerably with the types of materials learned. Easley has suggested that the curve of forgetting is probably positively accelerated at first.[14] This is illustrated in Figure 11-5. The short initial period of slow forgetting is illustrated by position *a*, while positions *b* and *c* illustrate a higher level of learning. He suggests that the interval between practices should be as long as can be tolerated without seriously affecting the right response. This provides a longer period of time in which wrong responses may be eliminated. Concerning this, he states: "We need, then, intervals in practice not only to rest but to forget these wrong responses, and with higher levels of learning these intervals may be lengthened without forgetting the right responses."

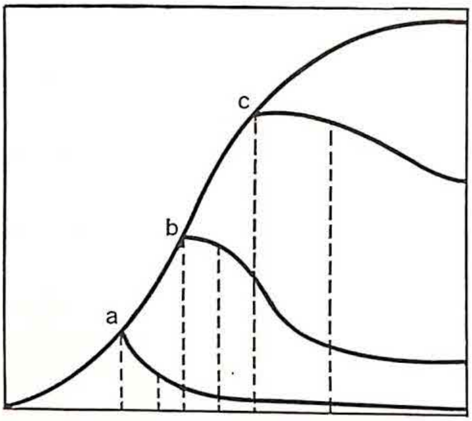

FIGURE 11-5. Relation between level of learning and rate of forgetting

Influence of time. It is a common observation that there is considerable loss of retention of materials learned at school. The percentage of loss is in direct relation to the length of time from the completion of the study of the materials. Johnson noted that there was a loss of 46.1 per cent during the three months following the completion of a course in elementary botany.[15] The early studies of Ebbinghaus showed that there was a very rapid rate of forgetting during the days immediately following the original learning. Almost all of the studies of this problem have verified the general results obtained by Ebbinghaus. The implications of these studies to problems of learning and teaching are clear. There should be a review of materials learned during the early stages following the learning in order to reduce the amount of forgetting. Reviews after this time should be less frequent.

Learning materials. Ebbinghaus found that the rate of forgetting eight series of 13 nonsense syllables each was very rapid at first, with a gradual leveling off thereafter. There is evidence that logical or meaningful materials are retained longer than nonsense syllables. A study reported by McGeoch indicates that logical or rational learning materials are retained longer than words or nonsense syllables.[16]

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[14] Howard Easley, "The Curve of Forgetting and the Distribution of Practice," *Journal of Educational Psychology*, Vol. 28 (1937), pp. 474-478.

[15] P. O. Johnson, "The Permanence of Learning in Elementary Botany," *Journal of Educational Psychology*, Vol. 21 (1930), pp. 37-47.

A study by Tyler was designed to test the hypothesis that information gained in a course that is seldom needed and applied will be readily forgotten.[17] Sixty-eight ninth-grade pupils were given the Ruch-Popenoe test which measures largely information, a multiple-choice explanation test of 50 items, together with generalization from given facts. The test was given in September and then repeated eight months later. The mean scores on these three tests are given in Table 11-1. These data support the hypothesis that ability to explain and the ability to generalize from known facts are retained better than mere information.

In order to compare the retention of verbal and motor skills Leavitt and Scholsberg selected the pursuit motor which was constructed from an adjustable phonograph motor set for one revolution per second.[18] The task of the subject was to establish and to maintain contact between a stylus and a silver target on the disc. A comparison of the retention curves for the two tasks revealed that the motor task was retained much better than the verbal, up to a period of ten weeks—the time of the termination of the experiment. A plausible explanation for much of this difference lies in the dissimilarity in the nature of the tasks. The nonsense syllables are not as readily integrated into a pattern. The motor skill task seems to involve the integration of visual, auditory, and kinæsthetic cues with a smooth circular motion of the hand.

TABLE 11-1. *Average scores on initial and final tests*

TEST	MEAN INITIAL SCORE	MEAN FINAL SCORE	MEAN LOSS IN EIGHT MONTHS
Ruch-Popenoe	27.9	16.8	11.1
Explanations	23.4	21.6	1.8
Generalizations	21.7	20.5	1.2

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[16] J. A. McGeoch, "The Comparative Retention of Maze Habits of Nonsense Syllables and of Rational Learning," *Journal of Experimental Psychology*, Vol. 15 (1932), pp. 662-680.

[17] R. W. Tyler, "What High-School Pupils Forget," *Educational Research Bulletin*, Vol. 9 (1930), pp. 490-492.

[18] H. J. Leavitt and Harold Scholsberg, "The Retention of Verbal and Motor Skills," *Journal of Experimental Psychology*, Vol. 34 (1944), pp. 404-417.

Thoroughness of learning. Retention is also influenced by the thoroughness of the initial learning. This may be observed in one's retention of Mother Goose rhymes learned as a child and repeated many times after the materials were originally learned. Motor skills are in general retained better than facts obtained from history and science. In the learning of a motor skill such as typing one is required to continue practice after the initial learning in order to reach a certain degree of proficiency. The continued practice has at times been referred to as *overlearning*. Certain investigators have thus suggested that if verbal materials and motor skills were practiced so as to produce a somewhat similar degree of proficiency, they would be equally retained, provided that the experiences following the learning were equally beneficial or detrimental to the retention of the two types of learned responses.

This problem was studied in an early experiment by Krueger in which monosyllabic words were memorized by different groups of subjects.[19] The words were presented by means of a memory drum at the rate of two seconds per word. When a subject was able to anticipate correctly all the words in a list during a single presentation there was 100-per-cent learning. To obtain 150-per-cent learning the presentations were continued until the number of trials equalled one half of that taken for the 100 per cent; while 200 per cent learning occurred when the presentations were continued an equal number of times taken for the 100-per-cent learning.

Results for the three degrees of learning are presented in Figure 11-6. These retention curves show that retention increased in direct relation to the amount of overlearning; however, there was not the corresponding increase in retention from 150-per-cent to 200-per-cent learning as there was from 100-per-cent to 150-per-cent learning. There is no doubt a point beyond which overlearning is uneconomical. The results suggest that overlearning by at least 50 per cent is highly desirable in order to increase retention.

Character of activity following the initial learning. Although the time interval is important in relation to learning and retention, one cannot assume that a certain time interval will operate equally effective regardless of the activity pursued during the time interval. It has been suggested by some investigators that time itself is relatively unimportant: time merely furnishing an opportunity for the operation of influences which affect learning.

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[19] W. C. Krueger, "The Effect of Overlearning on Retention," *Journal of Experimental Psychology*, Vol. 12 (1929), pp. 71-78.

Studies by Van Ormer showed that loss in recall was least when the materials learned were followed by a period of sleep.[20] Learning new material during this interim produced the greatest loss. The term *retroactive inhibition* has been used to designate this interference exerted by new material on the retention of previously learned materials. After reviewing the literature bearing on retroactive inhibition Swenson sets forth the following general conclusions:

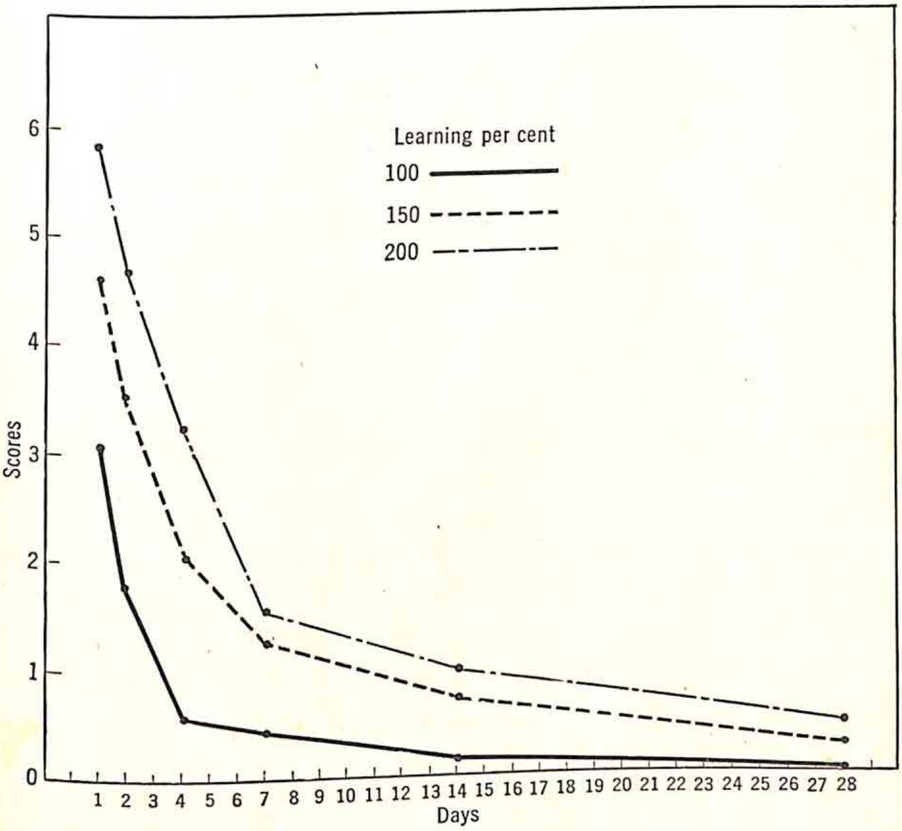

FIGURE 11-6. Average verbal recall scores obtained for different degrees of overlearning monosyllabic nouns

> It seems in general that the conditions contributing to the construction of well-organized patterns of knowledge and skill are those for which retroactive inhibition is at a minimum. Previous experience, meaningfulness of material, intelligence, and general maturity seem to result in such reduction of inhibitory effects. On the other hand, retroaction tends to increase under

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[20] E. B. Van Ormer, "Retention after Intervals of Sleep and of Waking," *Archives of Psychology,* Vol. 21 (1932), No. 137.

conditions contributing to disorganization or confusion of original and interpolated learning materials.[21]

SUMMARY AND GENERALIZATION

Learning has been defined in this chapter as an active process whereby the learner strives to attain a goal or goals which have significance to him. If this notion is accepted, then one of the central problems of the teacher is that of providing students with a series of related experiences which will help them attain goals which are meaningful to them at successive stages in their growth and development.

It has been implied throughout this chapter that there is only one learning process. In one sense this is true; however learning may be classified into many categories, depending upon the nature of the outcome. Previous chapters have dealt with emotional growth and learning, social skills, character formation, and the development of interests, attitudes, and ideals. Subsequent chapters will deal with the applications of learning to the development of motor skills, the acquisition of concepts and percepts, and the learning of the fundamental school subjects. Although the outcomes involved in these learnings differ, the fundamental principles involved in them are the same. Thus, while there are diverse kinds of learning, there are also fundamental learning principles which are common to all of these.

The various studies of factors and conditions influencing retention point to the following conclusions and educational implications:

1. The retention of materials learned or habits acquired is significantly affected by the extent to which the materials and habits are integrated into previously learned materials.
2. The rate of forgetting is most rapid during the period immediately following the learning. Special drills and reviews should be organized so as to reduce this rapid rate of forgetting.
3. Retention will be significantly affected by the purposes and goals of the learned; consequently a special effort should be made to relate habits, skills, and knowledge acquired to the learner's purposes and goals.
4. Overlearning is directly related to retention. There is, however, an optimum point of learning and overlearning which should be considered by the teacher. This may vary considerably with different individuals and different learnings.
5. Retention is affected by the nature of the activity immediately following the learning. This is important in connection with all study and learning situations.

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[21] Esther Swenson, *Retroactive Inhibition: A Review of the Literature* (University of Minnesota, Studies in Education, 1941), No. 1, p. 56.

6. Reviews and additional practice may aid the learner in retaining erroneous concepts and faulty habits. Consequently, the learner should be guided in eliminating wrong responses before they become more definitely fixed.

Questions and Exercises

1. Look up several definitions of learning. What do you observe in common among these definitions? Formulate a definition in your own terms.
2. In what ways is learning of animals and man similar. In what ways different?
3. What are the major characteristics of a learning curve? Under what conditions do plateaus occur? Why may they sometimes be regarded as highly desirable?
4. What essential differences in teaching occur when the learning process is regarded as an active one rather than a passive one on the part of the learner?
5. Using some learning task as an illustration show how learning is a process of reorganization.
6. What is meant by *insight?* How is it related to *differentiation?* Can you cite instances where it does not occur suddenly?
7. What is meant by the term *generalization?* Why is this important to those concerned with the educational process?
8. How would you account for the fact that meaningful materials are retained better than meaningless materials?
9. What are the educational implications of the notion presented that interests are learned?
10. Summarize the main ideas presented by Lester G. Anderson. What the psychology of learning has to contribute to the education of a teacher, *Journal of Educational Psychology,* Vol. 41 (1950), pp. 362-365.

Recommended Readings

Anderson, G. Lester and Gates, Arthur I., "The General Nature of Learning," *Forty-ninth Yearbook of the National Society for the Study of Education,* Part I, *Learning and Instruction.* (Chicago: University of Chicago Press, 1950), Chap. I.

Burton, William H., *The Guidance of Learning Activities,* 2nd ed. (New York: Appleton-Century-Crofts, Inc., 1952), Chap. VI.

Cronbach, Lee J., *Educational Psychology* (New York: Harcourt, Brace and Co., 1954), Chap. III.

Gates, Arthur I., *et al.*, *Educational Psychology*, 3rd ed. (New York: The Macmillan Co., 1948), Chap. IX.

Kingsley, Howard I., *The Nature and Conditions of Learning* (New York: Prentice-Hall, Inc., 1946).

McGeoch, J. A., and Irion, A. L., *The Psychology of Human Learning*, 2nd ed. (New York: Longmans, Green and Co., 1952).

Skinner, Chas E., ed., *Educational Psychology*, 3rd ed. (New York: Prentice-Hall, Inc., 1951), Chap. VIII.

Trow, W. C., *Educational Psychology*, 2nd ed. (Boston: Houghton Mifflin Co., 1950), Chap. XIII.

Woodruff, A. D., *The Psychology of Teaching*, rev. ed. (New York: Longmans, Green and Co., 1951), Chap. XV.

CHAPTER 12

Motivation in School Learning

THE NATURE AND CHARACTERISTICS OF MOTIVATION

IT IS WELL RECOGNIZED by all successful teachers that motivation on the part of pupils is essential for effective learning. Since motives are revealed in many ways and are often subtle in nature, it is ofen very difficult for the teacher to understand them. Two children may attempt to complete their arithmetic assignments for entirely different reasons. Also, two children may give entirely different expressions to similar motives. This may be observed by the different techniques used by children to get attention. One may be boisterous but not especially disorderly, while the other may resort to mischief and disorderly conduct. The understanding of a pupil's motive for studying, co-operating, and displaying initiative, is most important. However, the teacher must also be able to direct these motives so as to develop desirable habits and useful skills among the pupils.

The meaning of motives. Motives in relation to school learning should be thought of both in terms of the pupils and of the teachers. In the case of the pupils, motives are conditions within the organism which initiate activity in connection with some goal. Terms which have been used somewhat synonymously with motives include drives, needs, purposes, impulses, etc. Some of these are largely a result of the physiological nature of children, while others are an outgrowth of cultural conditions and demands. Hunger and fatigue are motives which are based upon the physiological needs of the individual. Co-operation and competition as motives are closely related to cultural forces. The motives resulting from cultural forces are sometimes very puzzling to the teacher, since different subcultures operate to develop different motives.[1] It was pointed out in Chapter 8 that social and cultural forces play an important role in habit formation. For example, fighting with fists is an approved way of getting along in many lower-class groups; whereas the middle-class child has learned that he must not fight girls, must not pick on younger children, and must not fight others in general except in self-defense. Modern anthropologists have shown that differences in motives and behavior among different tribes are closely related to cultural differences in child-rearing, education, and socialization in general.

The drive or motivating aspect of learning puts the emphasis upon the organism rather than upon the environmental stimulus. It is the "whole" organism which selects certain types of responses to an environmental situation, not some "mind" or "will" acting independently of the organism. Increased motivation leads to increased attention on the part of the individual to the particular situation.

The motives of teachers cannot be detached from the learning situation. The things teachers expect of pupils, their values and anxieties affect their relations with the pupils and the learning situation. The motives of pupils cannot be detached from those of their parents and teachers. Where these are at variance with each other, learning and adjustment difficulties occur. Character and personality development are outgrowths of the educative process. The motives of the child are of utmost importance in determining the nature and direction of his development. However, when it is realized that many motives are acquired, the importance of education and guidance can be more readily understood. Thus, the task of the school is not only to make use of the child's motives in enhancing the learning process but to modify existing motives and build new ones in harmony with the goals of the schools and of society.

Incentives. An incentive has been defined as "a goal object toward which a behavior sequence is directed."[2] Examples are food, grade in school, a position on the football team, or a poisonous snake which may produce an avoiding response.

Incentives differ from motives in that they exist as something apart from the individual. They may be described as objects or situations which when attained have the possibility of satisfying some motive. Motivation, as used in connection with learning situations, involves both incentives and motives. The child is motivated to solve an arithmetic problem when some incentive directly or indirectly related to the problem is presented. However, one should not oversimplify motivation. The performance of a school task may include a variety of incentives and motives. Such a situation is illustrated in the case of roller skating in Figure 12-1. There are various incentives to which the child responds. These arouse certain motives (M). Incentive I_3 is directly related to the task. This arouses the motive of satisfaction the child (Ch) secures from the activity itself. Those that are concerned with the guidance and training of children will find it profitable to use incentives that are harmonious with motives present in the learner.

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[1] See W. Allison Davis and Robert J. Havighurst, *Father of the Man: How Your Child Gets His Personality* (Boston: Houghton Mifflin Co., 1947).

[2] J. L. Fuller, "Situational Analysis: A Classification of Organism-field Interactions," *Psychological Review*, Vol. 51 (1950), pp. 3-18.

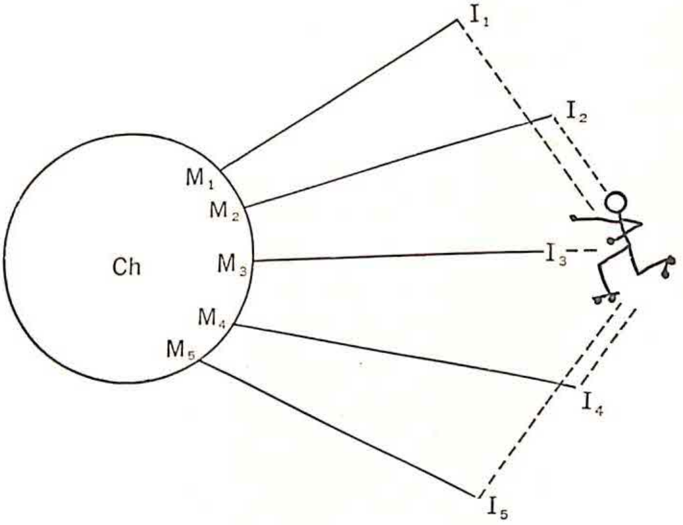

FIGURE 12-1. Schematic diagram showing the relation between motives and incentives operating in connection with roller skating

Ch = the child; *M* = motives; and *I* = incentives.

Incentives have at times been classified in two groups: (1) those relating directly to the performance itself, such as interest in skating, reading a story, or playing the piano; and (2) those relating indirectly to the performance of the task such as rewards, competition, and the like. In the first group the task to be performed supplies its own incentive. The incentive for the boy to read *Tom Sawyer* lies in the reading matter available. Most educators emphasize the value of the direct incentive, which has been referred to as an intrinsic interest in the task. Artificial incentives that have little relation with the goal to be attained may be short-lived and thus of little value. It should be emphasized, however, that interests are learned. They are not something which the teacher can draw upon as a "magic wand" to improve learning.

Extrinsic incentives such as rewards need not conflict with or interfere with direct interests in a task. This is observed in connection with interests in athletics. The reward commonly used in rewarding the players with a "Letter" enhances the intrinsic interests present in the athletic activities. Thus, external incentives may be useful in (1) the development of direct interests in a particular task, (2) the intensification of interest in a task, and (3) increasing performance in a task when no direct interests in it are present. There are, however, certain cautions which should be observed in the use of external incentives. Some of these are suggested later in this chapter.

Child dynamics and motivation. It was pointed out in Chapter 2 that the behavior and growth of the individual results from an interaction between the individual and his environment. Since different types of situations produce different interactions the behavior of the organism will vary accordingly. Thus, one might state that the situation is a determinant of behavior. However, the raw material of the school, the pupil, is the one who does the behaving. He approaches every situation in a state of readiness. This readiness may be to explore further the situation or to turn away from it. In either case, the child's reactions to a particular situation are potentially present when he approaches it. The nature of this potentiality for reaction is a result of the past interaction of the child and his environment. The manner in which the child reacts to harsh words from a teacher will depend upon the habits, attitudes, understandings, feelings, desires and other characteristics which he has built up through past experiences. The child brings both his heredity and past experiences to school with him. These have worked together in the development of a unified personality.

The concept of the child as a dynamic, growing individual has influenced our notion about motivation. The child comes into the world with certain definite needs. These needs grow and multiply as a result of varied experiences. One of the major differences between the growing child and lower animals lies in the multiplication of needs and desires on the part of the child. On the basis of his experiences he is constantly modifying his needs, and as he grows up they tend to become more realistic in nature. This is one of the indications of emotional and social maturity. It might be stated as a general principle that life is a process in which the individual is continuously adjusting to the conditions and forces of his environment. The dynamic nature of the organism makes this inevitable. However, the needs and dynamic nature of the individual are continuously undergoing changes as a result of this interaction. Furthermore, these changes are a result of learning. It was pointed out earlier that motives are primarily learned. It is the function of the teacher to guide the child in the development of desirable motives in relation to the learning of the school tasks.

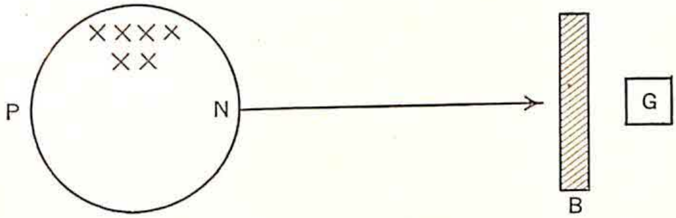

FIGURE 12-2. Schematic illustration of the operation of a need (*N*). When *P* is faced with a barrier (*B*) a state of tension illustrated by the cross marks appears

Due to the psychological nature of individuals they tend to react favorably to situations that inflate their ego and unfavorably toward those that deflate it; favorably toward areas where success is experienced and unfavorably toward those where failure is experienced. In all cases the individual, with his aspirations and goals relative to the status of the *self,* is involved. This is in harmony with the suggestion by Snygg and Combs that the basic need for all individuals is that of the preservation and enhancement of the self.[3] One of the most widely attempted methods used by the schools for enhancing the pupil's ego is the use of school marks. They provide the incentive for action on the part of some pupils; while for others they have little desirable value.

MOTIVATION AND LEARNING

In a democratic educational program, the matter of motivation is of paramount importance. The content of democratic education must proceed out of the felt needs of the individual and of the community in which he lives. The method of democratic education must be based upon the needs and interests of the pupils and must be closely interwoven in the interpersonal relationships found between teachers and pupils. The goals of democratic education must represent the highest values of the democratic society itself. Thus, it becomes evident that the problem of motivation lies at the very heart of a sound educational program in a free society.

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[3] D. Snygg and A. W. Combs, *Individual Behavior* (New York: Harper and Bros., 1949).

Maturation and motivation. It is generally recognized that children are not mature enough to do certain things which are performed by adults. We have shown that there is a close relationship between maturation and learning. It is also well known that interests and attitudes change with age. The wants and needs of the seven-year-old child are different from those of the ten-year-old. Thus, motives are modified and develop in harmony with certain maturational conditions. There is a need than to synchronize maturation and motivation. This is being done in the modern school program, as is evidenced by the selection of materials for modern readers, and the introduction of certain types of music and art in the elementary grades.

Since maturation and motivation tend to go hand in hand it is important for the school to attempt to keep children of the same level of maturation in the same classes, if they expect to cultivate common motives. Group dynamics are most effective when all members of the group are interested in the problem being studied. The importance of group membership and participation in learning activities is recognized in the modern school program. Where there are vast differences in motives group dynamics will be adversely affected. This interplay of individuals in a learning situation, referred to as group dynamics, is most important in the preparation of individuals for participation in a democratic society.

Learning as goal-seeking behavior. It was pointed out in Chapter 11 that learning is an active process not a passive one. This was noted by an early investigator in studies of memorizing. Poppelreuter [4] found that if he as a learner maintained a purely passive attitude while observing a series of nonsense syllables, there was little learning found even after fifty repetitions. Many investigators have shown that the amount of learning which takes place as a result of repetitions of certain experiences is directly related to the attention given to the task by the learner.

Goals and purposes are essential if the learner is to maintain a high degree of attention to the learning task. The nature of learning, as an active process whereby the learner strives to attain certain goals, is shown in Figure 12-3.[5] The responses of the learner are labeled R_1, R_2 R_3, $_4$, and R_5. The learner operates within a particular setting which is referred to as his environment. His behavior is goal-seeking in nature. This may be an effort to complete an arithmetic problem, to hit a ball, or to swim. In either case his behavior is at first variable—many of the responses being extraneous and largely irrelevant to the attainment of the goal. As learning proceeds, some of these responses are modified or eliminated, while the appropriate response is selected, thus reducing the variability of the responses. This was described in Chapter 11 as the process of differentiation and integration.

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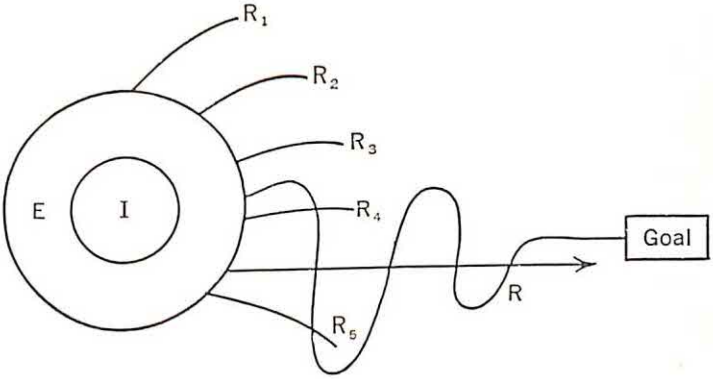
[4] W. Poppelreuter, "Nachweis der Unzweckmässigkeit der Gebräuchlichen Assoziationsexperimente," *Zeitschr. f. Psychol.*, Vol. 61 (1912), pp. 1-25.

[5] Figure 12-3 is adapted from Anderson and Gates, "The General Nature of Learning," *Forty-ninth Yearbook of the National Society for the Study of Education*, Part I, *Learning and Instruction* (Chicago: Univ. of Chicago Press, 1950), p. 17. Quoted by permission of the Society.



E = Environment
I = Individual

FIGURE 12-3. Learning as goal-seeking behavior

Learning takes place as a result of continued effort directed toward a goal with reasonable success. This reasonable success is a very relative term since success is here considered as subjective success. This will vary considerably from individual to individual. In learning to shoot marbles one boy may consider himself successful if he is able to average knocking one marble out of a ring with every three shots, while another would have to do two or three times this well to regard himself as successful. This problem is closely related to one's aspirations, as discussed at a later point in this chapter. There are some who would relate this success to some element in the emotions that accelerates or hinders learning. Any effects of the emotions are perhaps indirect rather than direct in nature. An unpleasant state or feeling may distract one's attention from the learning task and thus have an adverse effect upon learning, while a pleasant state may lead one to give increased attention to the task and thus be beneficial.

Intention to learn. Attitudes have an important effect upon one's learning and behavior. A learner may approach a learning task with an indifferent or passive attitude, a negative attitude, or a desire to learn it. The phenomenon of incidental learning appears when a person has acquired a skill or some knowledge without any intention or effort being consciously directed toward the learning task. It is a common observation that some learning takes place as a result of experiences, such as going to the fair, or traveling into a new territory. Much of the learning may be incidental, since it resulted from experiences in which no deliberate effort was directed toward the learning.

Although much learning does take place in an incidental manner, deliberate attention is a great aid to learning. This is demonstrated in an early experiment by Peterson in which two groups of 12 and 29 students in psychology were used as subjects.[6] Each group was given two lists of words to learn. In the case of the first group a list of words was merely put on the board and the students were told to copy them in order to use them in an experiment. Afterwards, without warning they were asked to reproduce in writing as many of the words as they could. This represents in Table 12-1 learning without retention. In a second test, this group was encouraged to learn the words and was informed that they would be tested on them at a later date. Tests for retention of both lists were given two days after the learning. In the case of Group 2 the lists were reversed so as to conceal differences that occurred in the difficulty of the two lists. A study of the results for the two groups, presented in Table 12-1, shows that the greatest advantage of learning with intention to recall over learning without intention to recall exists in delayed recall, although in immediate recall this method produced 14.8 per cent more with one group and 30 per cent more in the other group than did the learning without intention to recall.

TABLE 12-1. *The effect of intention to learn on the average number of words recalled*

	IMMEDIATE RECALL		DELAYED RECALL	
	WITHOUT INTENTION	WITH INTENTION	WITHOUT INTENTION	WITH INTENTION
Group 1	11.25	12.92	5.82	8.63
Group 2	10.21	13.27	6.77	10.21

The results of this study have been supported by more recent related studies of this problem. The results have, furthermore, been observed by students and teachers. It is obvious to every teacher that some students will expend a great deal more effort to acquire a new skill or enlarge a concept, than will others. This additional effort has at times been designated as determination or "the will to learn." This ego-inspired factor which the learner brings to the learning situation is a potent source of motivation. Undoubtedly one of the main reasons why students learn the rules of games readily, as well as other materials outside the classroom is a result of the presence of this factor or condition.

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[6] Joseph Peterson, "The Effect of Attitude on Immediate and Delayed Recall," *Journal of Educational Psychology*, Vol. 7 (1916), pp. 523-532.

Aspirations and learning. Experimental studies on the level of aspiration show that the same performance may be regarded as a success or failure depending upon the frame of reference in which the particular performance occurs. Success on the part of an eighth-grade student in competing with a high-school senior would be evaluated quite differently were he competing with a sixth-grade student. A student from a low-cultural status may feel that he has been successful if he remains in high school to graduate—something no other member of his family has done. Another student of equal scholastic ability but from a higher cultural background may feel that he has not been successful unless he enters college upon graduation. These aspirations become goals and are important motivational forces to learning and growth. The relationship between aspirations and goals may further be observed from a study of the conditions motivating a group of college students. One student may aspire to make the honor roll; another to be invited to join a fraternity; another to make the football team; and still another to get a satisfactory passing mark on all of the courses in which he enrolls during the scholastic year. The extent to which the student is able to reach his aspiration becomes in a large measure his own evaluation of his success or failure.

However, the level of aspiration represents for most individuals a compromise between their own evaluation of their ability and the performance or learning of a task and their desire to achieve a high level of performance. Also, the level of aspiration may have different meanings and serve different purposes depending upon the ability and needs of the individual concerned. A high level of aspiration may represent a direct expression of a goal, an incentive to better performances, or a means of protecting the ego.

Other things being equal, a person who is strongly motivated to do well at a task would be expected to have a higher level of aspiration than one not so highly motivated. However, Hull found from a study with college students as subjects that there was not a close relationship between aspiration and achievement.[7] Evidence from comments made by the subjects pointed to the conclusion that the more aspirations diverge from realistic predictions, the more defensive the behavior of the subject becomes. Thus, a pupil in danger of losing the esteem of his teacher or approval of his peers will set a high goal for himself even though he may not intend to exert much effort to attain it. This is simply an illustration of the operation of a defense mechanism in meeting a frustrating situation.

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[7] Robert R. Hull, "Level of Aspiration: Ambition or Defense," *Journal of Experimental Psychology,* Vol. 36 (1946), pp. 398-416.

We must not confuse a child's level of aspiration with his goal, although they are closely related. A child will not have a level of aspiration for all tasks, although he may have definite goals. In order to develop a level of aspiration he must have some notion of the difficulty of the task and of his own ability in the learning or performance of it. The young infant has a goal, such as that of securing milk from the bottle or breast. He displays a feeling of satisfaction or well-being when he attains his goal, but a feeling of success resulting from reaching a level of aspiration does not appear at this age. Through learning and maturation, the child develops goals and levels of aspirations which are closely identified with them. Thus maturity of aspiration is part of the total growth process. The study of Anderson, using as subjects 89 children ranging in age from two years and eleven months to eight years and one month, showed that the development of mature types of aspirations was closely related to chronological age and mental age.[8] The implications of this for the motivation of the school-age child are important. The aspiration level of the young child is likely to be feebly developed. Thus, one of the tasks of the teacher is that of guiding the child in the development of aspirations in harmony with his interests and abilities. Older children develop levels of aspiration in connection with the performance of problems that fall within their range of experiences. Here again, guidance is important; however the guidance should be directed toward the setting forth of aspirations in harmony with the goals, needs, and potential abilities of the individual.

The child's level of aspiration is also very unstable in connection with the performance of new tasks; but in the performance of familiar tasks he has already learned, to a degree at least, what level of difficulty he will be able to reach on the basis of his ability and the effort which he is likely to expend. This level, which he finds that he is able to reach, has a most important bearing in determining his level of aspiration. There is, furthermore, evidence that a child's level of aspiration will likely be lowered as a result of failure, while his level of aspiration will be raised as a result of success. The amount of failure or success necessary to change one's level of aspiration will vary considerably from individual to individual, and is perhaps a good indicator of such characteristics as determination and persistence.

[8] Carl Anderson, "The Development of a Level of Aspiration in Young Children," Ph. D. Thesis (State University of Iowa, 1940).

Success and failure. There is a close relationship between level of aspiration and success or failure. The first systematic study of such a relationship was conducted by Hoppe in 1930.[9] He made use of a variety of task situations to determine the conditions under which a person experiences success or failure. He found that success or failure, as experienced by the individual concerned, does not depend upon whether or not the task is completed but rather upon what the individual expected of himself. For example, if a pupil expects to complete all the problems in an arithmetic assignment, he would experience a feeling of failure if some were not completed. In the case of another child, a feeling of success may result from completing 60 per cent of the problems correctly, since he did not expect to solve more than half of them. An important source of conflict is often found between the level of aspiration of the individual pupil and that which the teacher has set up for the particular pupil.

The viewpoint of success and failure as motivating forces is often closely related to rewards and punishment. The reward of a star or a good mark on a paper may indicate to the child success in his learning or performance, while punishment may indicate failure. Results from studies conducted by Zeller indicate that when failure at a particular task is contrasted with success at another task, the failure associated with the first task has no measurable effect on the performance of the second.[10] Furthermore, when such failure, although associated with a particular task, is by inference related to associated tasks, the failure is as harmful to the performance on the associated tasks as if it had been specific to them. Previously known material which has been associated with unpleasant emotional experience (induced failure) is less well recalled than when such materials are associated with pleasant emotional experiences (induced success). This lends support to the explanation of learning in terms of repression of unpleasant experiences based upon failure.

An ill-effect of failure is the loss of self-confidence on the part of the individual concerned. It is possible, however, to teach children to accept failure, and at the same time to develop in them no loss of self-confidence. In this connection Keister noted that when young children are taught to accept failure as a temporary block on the way to ultimate success, the failure was not detrimental.[11] In fact, it might be stated as a general principle that children need to meet difficulties and rebuffs; but when these become the major events in their lives, they become barriers to further learning. When failure acts as a spur to increased effort, it enhances learning; when failure leads to a loss of confidence and reduced effort, it becomes a barrier to improvement. Children and adults need to feel adequate in capacity and skill to meet a fair proportion of the situations they are called upon to face. At the same time they need a fair balance between success and failure in the realization of their hopes and aspirations.[12]

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[9] Ferdinand Hoppe, "Erfolg und Misserfolg (Success and Failure)," *Psychol. Forsch.*, Vol. 14 (1930), pp. 1-52.

[10] Anchard F. Zeller, "An Experimental Analogue of Repression: III. The Effect of Induced Failure and Success on Memory Measured by Recall," *Journal of Experimental Psychology*, Vol. 42 (1951), pp. 32-38.

[11] M. E. Keister, "The Behavior of Young Children in Failure," *University of Iowa Studies in Child Welfare*, Vol. 14 (1937), pp. 28-32.

Rewards and punishments. Throughout the history of education the problem of motivation has been viewed in terms of finding ways to spur the pupils in their learning activities. Rewards in the form of stars, grades, prizes, and the like, have constantly been used. Several objections may be offered to the use of such artificial means of motivating pupils. In the first place there is usually little relation between the nature of the reward and the final learning goal. The pupil if encouraged to learn for the sake of securing a grade, star, prize, and other rewards that may be offered, rather than to achieve a particular learning goal. Again, rewards are at best only helpful for the small number of the class who think that they have a chance of winning. A prize for the best student in mathematics will likely become a contest between two or three pupils. It is usually very difficult to motivate students in college to learn certain things on their own initiative without any consideration of grades and credits. This perhaps stems in a large measure from the fact that pupils are instilled with the reward habit throughout the school program.

Reward is generally regarded as a better form of motivation than punishment, since it emphasizes the positive rather than the negative approach. It is closely identified with success, while punishment may be identified with failure.

Concerning the relative effects of punishment and reward, Estes concludes from a thorough experimental study of punishment: "No evidence has been forthcoming to indicate that punishment exerts a direct weakening effect upon a response comparable to the strengthening produced by a reward." [13]

The use of fear of punishment as a motivating force is undesirable, when viewed in the light of the results secured. Experimental investigations and observations of school people bear this out. It may be possible to produce evidence of increased performance or learning of some tasks as a result of fear of punishment. These results may be obtained at the expense of harmful effects to the individual's personality. Clinical studies show that punishing a child for thumb-sucking tends to aggravate the habit or to promote the development of other nervous habits. The punishment of a child for errors made in the learning of some difficult problem, such as may occur in arithmetic or spelling, oftentimes aids in the fixation of the incorrect response, since it is easier to continue the old habit and take the punishment than to attempt to form a new habit with the uncertainties accompanying it. The major objections to punishment may be summarized as follows:

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[12] Daniel A. Prescott, *Emotion and the Educative Process* (Washington: American Council on Education. 1938), p. 123.

[13] W. K. Estes, "An Experimental Study of Punishment," *Psychological Monographs,* Vol. 27 (1944), No. 3, p. 36.

1. The effects of punishment may be harmful to the child's personal and social adjustments.
2. Punishment may tend to fixate the behavior act for which the child is being punished rather than eliminate it.
3. Because of its interpersonal nature, punishment often functions to develop a barrier between the one administering the punishment and the one being punished.
4. There is some evidence that learning as a result of punishment as the motivating device is less permanent than learning resulting from rewards.

Unpleasantness is usually associated with punishment. It is the theory of psychoanalysis that we tend to forget through the mechanism of repression those things that are unpleasant. Studies of the content of materials remembered indicate that most persons tend to retain best what is agreeable and expel what is disagreeable. That this is not true for all individuals is supported by experimental evidence of Rosenzweig.[14] Using as subjects 60 college students, he investigated the recall of finished and unfinished tasks. He concludes from his study that the memory of unpleasant experiences is more frequently found among some subjects than for pleasant experiences. This study points further to the need to regard learning in terms of the needs and goals of the learner rather than in terms of certain types of incentives introduced into the learning situation.

The objections to punishment that have been listed, should not lead to the conclusion that punishment has no place in learning. There are cases where it may be useful, although it is difficult to apply punishment without reaping some of the harmful effects. When punishment is combined with rewards the results may be beneficial. A child who is punished for failure to get her assignment in on time may be rewarded when she gets her assignment in according to schedule. The effects of the reward outweighs the disadvantages resulting from procrastination. Again, when punishment is a direct outgrowth of the act, it may be beneficial. The child, who, because he refuses to help put away special play equipment, is not permitted the use of the equipment the next day is likely to benefit from this restriction. There is good evidence that certainty in the administering of punishment is more important than severity. Parents and teachers should be consistent in their discipline of children.

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[14] S. Rosenzweig, "An Experimental Study of Repression with Special Reference to Need-persistence and Ego-defensive Reactions to Frustration," *Journal of Experimental Psychology,* Vol. 32 (1943), pp. 64-74.

The relative effectiveness of praise and blame. Educational literature dealing with incentives provide a large number of statements relative to the superiority of praise over blame in the promotion of learning. Praise and blame may be thought of as a form of punishment and reward. It has been suggested that reproof has a disorganizing effect upon a child's ability to study and learn. The question may also be raised whether or not a child will be able to organize his thinking effectively under the emotional state resulting from much praise. Although the notion of the superiority of praise over blame is quite widespread, Schmidt points out from a careful review of the literature to 1940 that "there is to be found no unequivocal evidence to support the stand." [15]

In a study of this problem Schmidt used as subjects 85 boys and 81 girls from seventh-grade classes, 84 boys and 102 girls from eighth-grade classes, 192 boys from a private high school, and 30 college students. These students were divided into *Praise, Blame,* and *Control groups.* The control group of students were neither praised nor blamed in connection with their learning performances. The other groups were praised or blamed in their performances in a manner similar to that found in the ordinary classroom situation. A comparison of the learning of the three groups showed that neither praise nor blame can be singled out as being the more effective. There was evidence pointing to the harmful effects of overstimulation on learning. It was also observed that results obtained by Tester A were consistently higher than those obtained by Tester B. These differences developed in spite of the fact that standardized test procedures were carefully followed and other conditions were controlled.

The human factor is most important in all motivating situations. "How a thing is done" is often much more important than "What is done." In speaking to a pupil "How criticism is given" may be more important than "What criticism is given." When reproof is given in a spirit of helpfulness with an understanding of the person's limitations it may prove most helpful;

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[15] Hermann O. Schmidt, "The Effects of Praise and Blame as Incentives to Learning," *Psychological Monographs,* Vol. 23 (1941), No. 240.

however, when it is given in a spirit of abuse and distrust without a careful consideration of the characteristics and abilities of the person concerned, it is most likely to be more harmful than good. The teacher-pupil relationship overshadows the mere use of praise or blame in a learning situation.

MOTIVATION IN SCHOOL PRACTICE

The various experiments on motivation and learning show clearly that there are no special tricks to motivation. Motivation of learning is not something mysterious which the teacher can draw upon for teaching geography, arithmetic, and other aspects of the school program. The teacher's personality, the nature and dynamics of the group, the interests of the pupils, the home and school environments, and various forces within the community, will have important effects upon the drives and motives of the individual pupils. There are, however, certain school practices which tend to enhance motivation in learning, while other school practices have a detrimental effect.

Marks and grades. The use of marks and grades as motivating devices are almost universal, although there have been some outstanding modifications of this practice by some schools during the past several decades. For many years a large percentage of elementary and secondary schools advanced pupils from grade to grade on the basis of marks earned from subject-matter tests. Failure of from 20 to 30 per cent of pupils in the first-grade was quite common, and the failure practice was used quite extensively throughout the grades. The fear of low marks and the threat of failure was considered by many as a desirable motivating device. There is good evidence that children held back with younger children do not as a general rule do as well with their school achievement as children of the same educational ability who proceed through the grades with their own age group.[16] Furthermore, the social and emotional effects of nonpromotion are likely to be harmful to many children.

A desire to win for the sake of winning, and the frustrations resulting from failure in such competition, may be aggravated by parents who seek to realize their own ambitions through their children. The awarding of prizes and school marks are indicators to the individual of his status. However, there is no particular reason to believe that he will not recognize his deficiencies in the absence of these. These no doubt serve as incentives for many children; however, the teacher should guide the pupils in the

[16] See Hollis L. Caswell, "Policies and Practices in Regulating Pupil Progress," *Education in the Elementary School* (New York: American Book Co., 1950), pp. 248-300.

development of intrinsic interests and goals as motivating factors. If all motivation is related to incentives, in the nature of prizes and grades, there will be little continuity in the form of goal-seeking behavior.

Knowledge of results. Grades are designed to give the pupil a knowledge of how well he is getting along with his school learning. They also give pupils information about their relative standing in class in comparison with the other members of the class. When the student receives a grade of A, and he realizes that only a few students received such a grade, he is at once made aware that he ranks as one of the best in the class; whereas a grade of D or F leads him to realize that he is among the poorest students. He is less worried about a low grade if there are many other students receiving a like grade.

One of the early experiments on the effects of knowledge of success was conducted with 358 fourth-grade children.[17] The experimental group kept individual progress charts and made graphic charts of their progress in arithmetic fundamentals during the 21 weeks period of the experiment; while the pupils of the control group were not informed of their scores during this time. The gains of the experimental group were significantly greater than those of the control group. These differences were greatest for those in the upper quartile of the class and least for those in the lower quartile, indicating that knowledge of progress is more effective for average and superior students and less effective for the inferior ones.

A definite goal and a clear knowledge of the progress that one is making toward that goal are very important motivating forces. A boy who is trying to gain weight will be motivated to eat a well-balanced diet in order to achieve his goal. He will be further motivated if he can note from time to time the progress that he is making toward reaching his goal. This form of motivation is built upon the notion that "Success breeds success." Success in making progress toward one's goal is one of the most important motivating forces for the individual. This success can very well be brought to the student's attention from time to time through giving him information about the progress he is making.

Samples of pupiis' work kept over a period of time are not only valuable in evaluating growth but are useful as motivating and diagnostic instruments. A sample of handwriting or spelling secured at the beginning of the year can be a basis for encouraging the pupil, if it is used at a later period of the year as a basis for revealing progress. The use of handwriting charts, art models, and other materials which are well-nigh perfect are often sources of discouragement for the elementary-school child, since the comparisons between his work and the model are most unfavorable to him.

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[17] *Report of the Society's Committee on Arithmetic, Twenty-ninth Yearbook of the National Society for the Study of Education* (1930), pp. 611-619.

Samples of short compositions, arithmetic work, creative art, and the like, may be included in the teacher's folder for each of the pupils. Many drill tests furnish the child with a means of detecting his abilities and difficulties. When comparisons are made periodically of achievement on such tests the child will be able to note the extent to which he is making progress. The advantage of knowledge of results as a motive is that the student is competing with himself rather than a large group of individuals. His chances of succeeding are exceedingly good. A knowledge of his results will help him in setting up aspirations and goals. It was pointed out earlier in this chapter that these, when properly directed, become important motivating forces. Another advantage of this method is its availability. Any teacher can make use of this method merely by seeing that work samples and other related materials are kept for a period of time. This period of time need not be long. The pupil may be able to note progress from day to day in his ability to work arithmetic problems, or to read, or to spell. In mechanical work, art, and writing, he is often able to note progress over a relatively short period of time, even without samples and tests. This may be observed from statements which he makes about his work. Where such progress is noted there is likely to be an increased interest in the learning activities.

Competition. Competition is a method commonly used by teachers to increase achievement. Its effectiveness has been demonstrated by several investigators. In a study by Maller sixth-grade children were urged to see who could make the greatest gain in adding number couplets.[18] A considerable gain in output was found for the class. The results presented in Figure 12-4 show that the highest level of performance was found when each child was trying to excell the other children, while the results of competition were less marked when one class as a group was competing with another class as a group. These results indicate that among sixth-grade children individual competition increased output more than did group competition. These results are no doubt closely related to cultural forces in our society which tend to promote individual rather than group competition.

THE EFFECTS OF OVERCOMPETITION. It was pointed out in Chapter 5 that competition among American children appears early. Since this is characteristic of certain aspects of our culture, children must learn to deal with competitive situations. However, school practices may emphasize this to such an extent that maladjustments result among certain school children. There are some educators who feel that examinations, marks, and grades put an undue emphasis upon competition involving the learning of materials included in the school curriculum. The effects of this is to discourage the slow learner and, in some cases, to develop in him a sense of failure. The fast learner may develop an exaggerated sense of his own importance along with a feeling that the slow learner is unimportant and doesn't deserve much consideration.

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[18] J. B. Maller, *Cooperation and Competition: An Experimental Study in Motivation* (Teachers College, Columbia University, Contributions to Education, 1929), No. 384.

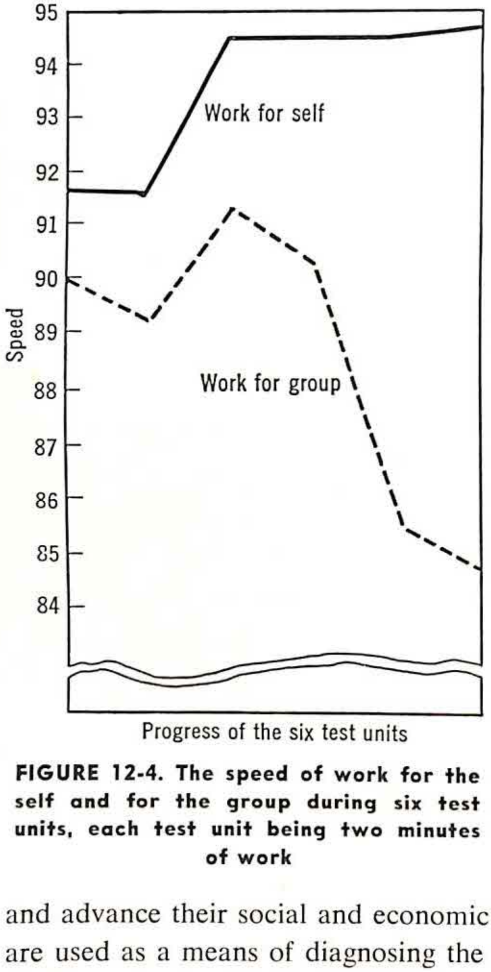

FIGURE 12-4. The speed of work for the self and for the group during six test units, each test unit being two minutes of work

When the results of tests and examinations are used as a basis for grades, an undue strain may be placed upon average and below-average pupils to succeed. This strain is oftentimes heightened by parents, especially parents of the upper-lower class group who are most anxious for their children to make the grade and advance their social and economic position. However, when such tests are used as a means of diagnosing the difficulties of pupils, they provide a basis for the educational guidance of the pupils. In such a case they serve a most useful and worthy purpose.

COMPETITION VERSUS CO-OPERATION. Individual competition as a motivating device often fails to motivate those students with average ability, since they see little chance of winning. Also, competition may be stressed to such a degree that group co-operation is endangered. The differences between groups working on a co-operative and on a competitive basis may be described as follows:

1. In the co-operative situation the goal, if attainable, will be attained by all members of the group.

2. In the competitive situation, the goal will be reached by a limited number of the members of the group, while the others will be unable to reach it.
3. Individual competition places the emphasis upon individual attainment. The emphasis in co-operation is not always closely identified with attainment.

A study conducted with three groups of second-grade pupils as subjects furnishes valuable information about the effects of working for groups and individual rewards.[19] Each group was asked to paint two murals. In the case of the first one they were told that if everyone painted well and the mural was of good quality, everyone would receive a prize. For the second mural the instructions were that the best painter would be given a prize. The effects of the co-operative situation and the competitive situation were carefully evaluated. More negative interactions than positive interactions appeared, according to the data presented in Table 12-2, when there were individual rewards. The group reward, although the experiment was not always purely co-operative as evidenced from observations and comments of the children, produced significantly more friendly reactions within the group. The children shared materials and helped one another more often in the co-operative situation. However, it was noted that not all children worked constructively together in the co-operative situation; while some of the children were co-operative in the competitive situation. Children bring with them to school co-operative and competitive attitudes, which

TABLE 12-2. *Frequency and percentage of positive and negative behavior recorded in group- and individual-reward painting situations and play periods for three second-grade groups*

GROUP	WORK		PLAY	
	POSITIVE PER CENT	NEGATIVE PER CENT	POSITIVE PER CENT	NEGATIVE PER CENT
I. Group rewards	58	42	75	25
Individual rewards	43	57	56	44
II. Group rewards	81	19	54	46
Individual rewards	42	58	50	50
III. Group rewards	80	20	44	56
Individual rewards	56	44	40	60
Average—group rewards	73	27	58	42
Average—individual rewards	47	53	49	51

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[19] C. Stendler, D. Damrin, and A. C. Haines, "Studies in Cooperation and Competition: I. The Effects of Working for Group and Individual Rewards on the Social Climate of Children's Groups," *Journal of Genetic Psychology*, Vol. 79 (1951), pp. 173-197.

are a part of their cultural conditioning received from their home background. Schools which encourage co-operation will be able to develop more positive interactions in a group than if they emphasize competition.

Our classroom activities usually reflect a mixture of co-operation and competition. Within recent years teachers have attempted to have children work co-operatively upon certain common problems, hoping thereby to develop co-operative habits of work and attitudes. At the same time many activities are sometimes organized in a highly competitive manner. In such a case the child knows that if his art work is the best it will be displayed. Only a small group will be chosen as outstanding pupils in reading or spelling. Even the grading system takes on characteristics of a highly competitive nature. After analyzing the literature dealing with co-operation and competition Morton Deutsche concludes that the crux of the differences lies in the attainment of goals.[20]

GOALS THROUGH CO-OPERATIVE PLANNING. A unit of work which the pupils have helped to plan has more meaning and purpose to them than work which has been assigned to them in the traditional manner. This is very important in relation to motivation, the absence of which usually leads to failure. There are three distinct values to be derived from the pupils having a definite goal. The first of these is that a goal *serves as a guide* to the student in his efforts and experiences. He sees more clearly the reason or purpose for various activities involved in the learning experiences.

Second, a goal tends to *increase interest and effort*. This may be observed in connection with planning for Visitors Day at school or on other occasions when the pupils have had a significant role in the planning. Third, *increased satisfaction results from goal-motivated behavior*. The attainment of the goal brings forth a real feeling of success and the accompanying satisfaction which goes with it. Often children fail to realize that they have acquired new skills, concepts, or understandings because they did not have a clear picture of the goal. If through co-operative planning they had developed a clearer perspective of the goal, success would have been more readily recognized and satisfaction attained.

Group dynamics in the classroom. Group dynamics refers to the interplay between individuals in group situations. It has been observed that the growth and development of the individual child is affected by the nature of the controls which he encounters during the growing years. Children respond best to kindness and a pleasant voice on the part of adults. The teacher must be able to instill confidence in the members of the group, if he expects to receive their co-operation. Suggestions and directions carefully given to the group are better than hurried directives and threats. Positive forms of punishment in a spirit of helpfulness are more effective than constant scoldings and threats. This was noted by Lippitt in an experiment in which comparisons were made between the responses of children to *autocratic* and *democratic* management, referred to in Chapter 9. The children were divided into small groups with five members each, and were controlled on the one hand by autocratic procedures, while other groups were controlled by democratic procedures. Hostility, resistance, efforts to secure attention, and hostile criticism between the members comprising a group was found more frequently in the group where autocratic controls were used.[21] There are a number of other studies which indicate that children are more co-operative, show more initiative, quarrel less, and display less friction and hostility between the members when they work in a group where democratic leadership prevails.

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[20] Morton Deutsche, "An Experimental Study of the Effect of cooperation and Competition upon Group Processes," *Human Relations*, Vol. 2 (1949), pp. 199-231.

The importance of group dynamics in education is emphasized today more than ever before. It is, first of all, an educational method, though not the only one. It enhances learning and aids in clarifying a particular problem. It should not be considered a device for creating ideas or new motor skills. It is effective in spreading ideas and in the enlargement and clarification of concepts and viewpoints. It is also effective in building attitudes and social understandings. However, individuals must still arrive at original ideas through individual effort, they must still develop motor skills through the best practice techniques, and they must still develop some potential talent or ability through continued and sustained effort. However, the process whereby the individual has a problem for study, and must consider the ideas and viewpoints of other members of the group should prove helpful not only in better understanding the problem but also in the development of social skills essential for democratic living. Group dynamics offers the best means available for developing better social understanding and preparing the individual members of the group for democratic citizenship.

The role of interests and goals. Oftentimes teachers speak of basing the program of instruction upon the child's interests, as if interests exist as some separate entity that can be mysteriously found in the child's life and used as a basis for all learning. Actually interests are learned as truly as is the case for any other learning. Furthermore, they are not learned as something separate and apart from the acquisition of skills, information, attitudes, and habit patterns. Thus, an educational policy of using a child's interests may be misleading. This does not mean that one should not take into account interests; but rather that a good educational policy will tend to promote the growth of interests. For example a child may be interested in animal life. This interest is especially important to the elementary-school teacher in the promotion of reading skills. However, a good program of reading instruction will also tend to promote the growth of reading interests.

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[21] R. Lippitt, "An Experimental Study of the Effect of Democratic and Authoritarian Group Atmosphere," *University of Iowa Studies in Child Welfare,* Vol. 16 (1940), No. 3.

It was pointed out in Chapter 8 that interests grow out of satisfying experiences. Children have acquired many interests before entering school. These interests are broadened as a result of school experiences. A study reported by Jersild and Tasch showed that at all grade levels, children expressed an interest in study and subject matter areas encountered at school.[22] The decline of interest in study and the subject-matter area with advanced age level shown in Table 12-3 presents a challenge to teachers. Since the interests shown are relative, this decline may be accounted for in a large measure by the increased interest in other areas such as sports, social activities, clubs, and the like.

TABLE 12-3. *What I like best in school* *

CATEGORY	*Ages 9–12*		*Ages 15–18*		*Ages 12–15*	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
Sports, games, physical education	13.3	9.5	30.6	33.2	34.8	34.4
Area of study, subject matter	69.7	76.3	44.4	60.1	41.3	45.5
Art activity or appreciation: music, painting, drawing	11.1	14.8	10.0	15.9	16.2	13.8
Crafts, mechanical arts	.3	0	19.8	0	15.5	.4
Discussion clubs, student council	1.3	.8	1.0	.5	3.6	6.4
People: both pupils and teachers	2.5	6.1	4.1	5.6	6.0	11.4

* After Jersild and Tasch.

Interests and goals cannot be completely separated. The child's aspirations are expressed in the goals he has set forth. The goal may be that of taking part in the Christmas program. In such a case, he will direct his activities toward the attainment of the goal. Parents and teachers should encourage children to set forth goals. The job of the teacher is to find ways of combining worthwhile educational activities with existing interests, and to direct the child in the establishment of desirable goals within the reach of his attainment. In this way, education becomes personal, significant, and meaningful to the child. It might be stated as a general principle that the presence of interest in any school activity is an indication of educational health, while its absence is an indication of a lack of adjustment between the child and the school program. The teaching of counting becomes a personal and worthwhile process for the boy or girl when this provides a means of determining how many school days there are until Christmas. Studies of learning in the sciences show that meanings, interests, and increased knowledge and understanding go along together. The learning of botany becomes more meaningful when it is applied to plant life found on the school grounds or in the nearby city park. In substance, personal interests might be called the starting point of instruction, a readiness for learning and growth in an increased understanding or skill and widened interests.

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[22] A. T. Jersild and Ruth J. Tasch, *Children's Interests* (Teachers College, Columbia University, Contributions to Education, 1949).

CONCLUSIONS AND GENERALIZATIONS

Conclusions from studies of motivation show that there is no formula or set of procedures which will be effective for all pupils. Furthermore, these studies show that the total *motivating situation* is more important for stimulating learning than are isolated factors of such variables as grades, prizes, or punishment. These are often attempts to apply motivation as a force introduced apart from the true learning situation. In the final analysis the effectiveness of any incentive depends primarily upon the nature of the pupil. For example, reproof appears to improve the work of the extrovert; whereas it is more likely to be harmful to the performance of the introvert. If theory and research on motivation is to have any value for teachers they must first concentrate attention on the whole person in the process of adjusting to a situation.[23] Second, they must recognize the importance of the situational-pattern in relation to behavioral reactions. External incentives have certain values in (1) learning new materials, (2) developing interests in new learning materials, and (3) increasing the total stimulation of the individual. There are degrees, however, in overcompetition. Too much praise and blame, and too great an emphasis upon grades or external rewards are harmful to the individual involved.

Child dynamics is very important in relation to motivation. A proper balance must be established and maintained between success and failure. Children may be taught to accept failure if it is closely related to ultimate success, or if the apparent failure is actually success in terms of reaching certain aspirations or goals. The child's aspirations must be in harmony with his abilities, if frustration is to be avoided. Immediate goals are more essential for young children than for older ones. An important function of the teacher is to help the child set forth sound and worthwhile goals.

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[23] Asabel D. Woodruff, "Motivation Theory and Educational Practice," *Journal of Educational Psychology*, Vol. 40 (1949), pp. 33-40.

The importance of self-evaluation and success, as motivating forces, has been emphasized throughout this chapter. The skillful teacher makes use of subject-matter materials that are challenging to the pupils, self-evaluation of progress, individual and group dynamics, and a favorable instructional setting to stimulate the pupils to increased learning. These are essential elements in guidance and teaching.

Questions and Exercises

1. What are the general conclusions about the relative values of praise and reproof as incentives for learning? What are the implications of these conclusions to the teaching of spelling?
2. How are a child's aspirations related to motivation? What do experiments reveal about the nature of aspirations?
3. How are aspirations related to interests and values, discussed in Chapter 8? What are the responsibilities of the school in the development and guidance of the child's aspirations?
4. List some conditions which are conducive to effective attention in the classroom? Is the quiet class necessarily the most attentive class? Explain the reasons for your answer.
5. Compare the advantages and disadvantages of *competition* and *co-operation* in teaching.
6. Recall some classroom situation where the teacher attempted to get you interested in the subject. Evaluate the effectiveness of the methods used.
7. What are the major advantages to having the pupils participate in planning a unit of work? What are the disadvantages?
8. Comment on the statement: It makes little difference what incentive is used in teaching a skill so long as mastery is finally acquired.
9. Compare the levels of aspirations of successful and unsuccessful children presented in the study by Pauline S. Sears, "Levels of Aspiration in Academically Successful and Unsuccessful Children," *Journal of Abnormal and Social Psychology,* Vol. 35 (1940), pp. 498-536.

Recommended Readings

Cronbach, Lee J., *Educational Psychology* (New York: Harcourt, Brace and Co., 1954), Chap. XIV.

Crow, Lester D., and Crow, Alice, *Educational Psychology* (New York: American Book Co., 1948), Chap. XIII.

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: The Macmillan Co., 1948).

Hilgard, Ernest R., and Russell, David H., "Motivation in School Learning," *Learning and Instruction, Forty-ninth Yearbook of the National Society for the Study of Education,* Part I (Chicago: University of Chicago Press, 1950), Chap. II.

Kingsley, H. L., *The Nature and Conditions of Learning* (New York: Prentice-Hall, Inc., 1946), Chap. VI.

Skinner, Chas. E., ed., *Educational Psychology,* 3rd ed. (New York: Prentice-Hall, Inc., 1951).

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), Chap. XI.

Thorndike, Edward L., *The Psychology of Wants, Interests, and Attitudes* (New York: D. Appleton-Century Co., Inc., 1935).

CHAPTER 13

Perceptual-Motor Learning

THE ACQUISITION of motor skills begins in an elementary form so early in the child's life that it is identified as an integral part of total growth process. Furthermore, such skills are at all times interrelated with all other aspects of growth. And, although we speak of different kinds of learning and growth, it should be emphasized that all growth and learning tend to follow certain general principles set forth in the previous chapters. However, some of these principles may be more readily observed in some learning than in other kinds of learning. The importance of maturation, experience, motivation, and related habits and experiences may be observed in the acquisition of motor skills and meanings.

THE NATURE AND CHARACTER OF MOTOR ACTIVITIES

Motor behavior is apparent in all aspects of the school program, although it is usually more in evidence in those activities referred to as extracurricular or extraclass and vocational. Ragsdale has grouped motor skills into three broad categories: object-motor activities, language-motor activities, and feeling-motor activities.[1] This classification will be used in the brief description of motor skills that follows.

Patterns of skilled action. Motor skills have form, internal organization, rhythm, precision, force, and co-ordination. The particular pattern developed by an individual will depend upon a number of factors such as (1) maturation, (2) body build, (3) past experiences, and (4) constitutional characteristics. Thus, they are not fixed for an individual, neither are they similar in pattern for all individuals. Each person has his own particular rhythm and form. This may be noted in the case of children skipping rope. One child may assume a posture almost completely upright in nature while another child remains in a stooped posture or position. There may be variations noted in their movements involving different parts of the body. For best performance each individual will develop the form most appropriate for his ability and constitutional characteristics, although there are certain general features which may be regarded as good form, while others may be classified as bad form. However, since all children are biophysical organisms there will be limits within which each child will tend to operate.

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[1] C. E. Ragsdale, "How Children Learn the Motor Types of Activities," *Forty-ninth Yearbook of the National Society for the Study of Education*, Part I, *Learning and Instruction* (Chicago: Univ. of Chicago Press, 1950), Chap. III.

The task of the teacher is that of determining what are some of the essentials of good form. Certainly there are some techniques of moving the lips and tongue which have been found best for producing distinct sounds. There are methods of movement and co-ordinations which are useful to the person in learning to bat a ball. Furthermore, certain motor co-ordinations are dependent upon previous learnings. The child who has not learned to skip will find it very difficult if not impossible to acquire certain dance skills. In such a case the learner may have to practice certain essential movements before progress can be made in the particular dance with which he is confronted.

Learning curves. Some of the special features of learning curves were described in Chapter 11. These learning curves never show absolutely smooth progress. Furthermore, they tend to vary with the nature and complexity of the learning task. In a series of experiments conducted by Krueger the learners were required to toss rings (Mason jar rings), one at a time, in such a manner that the ring should fall upon and remain hanging on a nail in the wall, four feet above the floor.[2] Four groups of undergraduate college students were used as subjects. One group of subjects pitched the rings from a distance of two feet from the toe of the subject to the wall. A second group tossed the rings from a distance of three feet, a third group from a distance of six feet, and a fourth group from a distance of nine feet.

One preliminary practice session was given to each subject to familiarize him with the condition of the experiment. The averages for the various trials and the different distances for tossing the rings are presented in Figure 13-1. These curves show that as the distances were increased there was a decrease in the number of correct responses. Also, the learning curves showed that when the difficulty of the learning task was increased there was very little improvement in the initial stage. Thus, as the learning task shifts from relatively easy to relatively difficult ones the rate of learning tends to shift from negative to positive acceleration.

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[2] William C. F. Krueger, "Influence of Difficulty of Perceptual-motor Task upon the Acceleration of Curves of Learning," *The Journal of Educational Psychology*, Vol. 38 (1947), pp. 51-53.

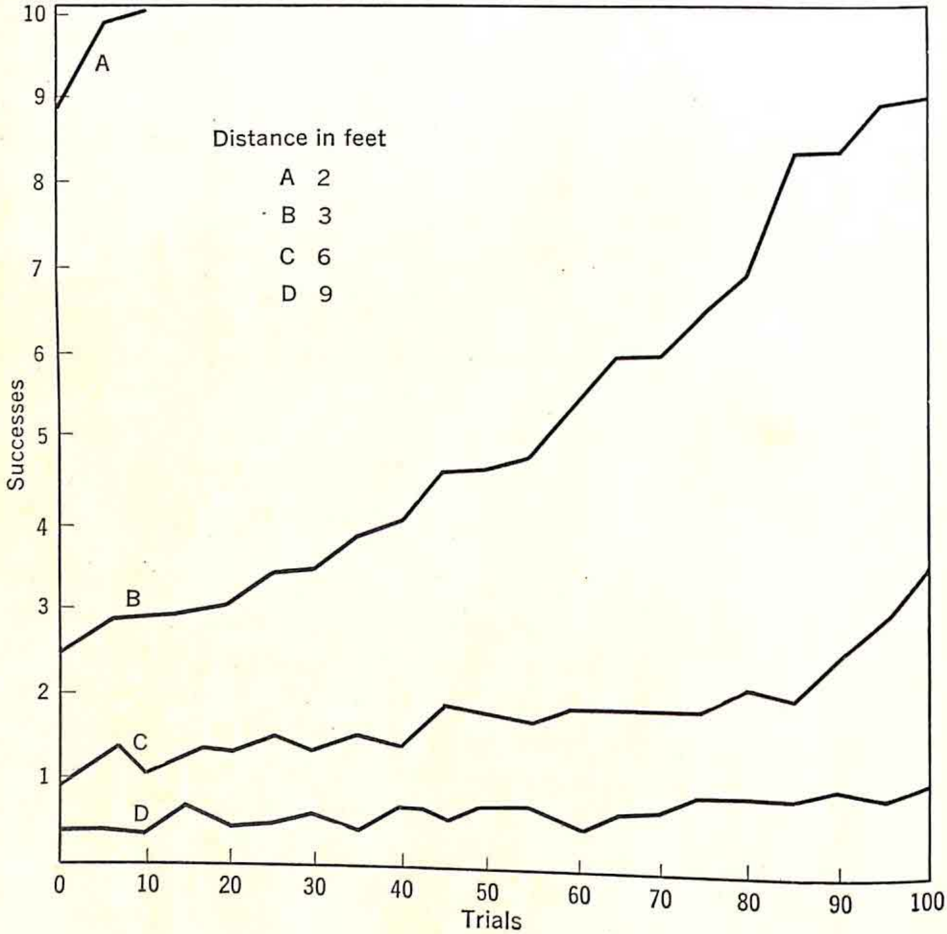

FIGURE 13-1. Curves of learning derived from tasks of varying difficulty

Object-motor activities. This category of motor activities includes the use of tools in household and industrial pursuits; manipulation of materials such as wood, metal, fabrics, and the like; the use of measuring and recording devices; manipulation of objects involved in sports and recreation such as balls, fishing materials, swings, etc. Most of these activities call for judgment, understanding, and a period of learning. The extent to which they call for these will vary with the nature and complexity of the particular activity.

The development of manual-tool skills will depend upon a number of factors, among which may be listed: (1) the maturity of the learner, (2) the organization of the units of work, (3) the complexity of the learning task, (4) the motivation of the learner, and (5) the nature of the instruction or guidance. Manual-tool activities should be an important part of the elementary-school program; however these activities should be closely related to other aspects of the school program. They should be closely correlated with work in fine arts. Good design should be carried over in the making of a baby crib or a home for a pet rabbit. Tools and procedures should be carefully chosen with regard to their functional use and the maturity and experiences of the pupils.

Language-motor activities. The language-motor activities include movements of the speech organs, eye-movements used in reading, and the movements involved in handwriting, telegraphy, commercial arts, and mechanical drawing. Special consideration will be given here to the vocal skills, writing skills, and eye-movements involved in reading.

VOCAL SKILLS. A consideration of problems involved in speech, oral reading, and singing reveal that there are certain common elements. The child's speech beings with babbling sounds, some of which are understood by the mother at an early age. There is a continuous growth in comprehensible speech so that by the age of three years approximately 90 per cent of the child's remarks are understandable.[3] However, the ability to articulate the words correctly lags far behind. Even at the beginning of the first grade, a rather large number of words are incorrectly pronounced. Most children will outgrow faulty pronunciation classified as baby talk. Too much attention may aggravate the speech difficulty rather than help to correct it. In the case of children who persist in lisping or stuttering, the teacher should seek the help of a specialist, who may, in addition to treatments which he is able to give, suggest special exercises to be carried on by the teacher.

Oral reading is recognized today as an important part of a well-balanced program in the elementary school. In addition to the values obtained in auditory acuity and discrimination, the work in oral reading may be developed so as to provide for individual motivation, group dynamics, and desirable personal and social development. Needless to say, correct articulation is essential for successful oral reading. However, this alone is not sufficient. The child must, in addition, have learned to read and must have had guided experiences in oral reading. It is important for the teacher to realize that successful oral reading does not just happen, but results from correct articulation, experiences in oral reading, guidance, and motivation.

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[3] See Dorothea McCarthy, "Language Development in Children," in *Manual of Child Psychology,* rev. ed., L. Carmichael, ed. (New York: John Wiley and Sons, Inc., 1954).

It has been noted that children spontaneously produce melodic fragments at an early age.[4] These are marked by a lack of semitone steps, and appear with all kinds of rhythmic formations. One study of the effects of systematic training on the singing ability of children who were severely lacking in pitch discriminationability indicated that such a disability may be significantly improved through training.[5] However, the nature of this training must harmonize with the maturational level of the child. Specialized instrumental training at too early an age will bring forth only meager results, and may condition the child against such musical experiences. The same amount of time and effort given at an early age to the singing of folksongs, songs involving games, and the like produces better results, since such training makes use of childhood interests and involves simpler muscular skills.

WRITING SKILLS. The skills developed in learning to write are based on previously acquired movements and abilities. Readiness for writing is determined in part by the extent to which these movements and abilities have developed, and in part by the motivation of the individual subject. Thus maturation, practice, and motivation are factors which contribute to readiness for writing instruction. In a study reported by Ames and Ilg the spontaneous pencil and paper behavior of fifty or more preschool children was observed at each six-month age period from three through six years of age.[6] This behavior was carefully analyzed to determine the normal course of development of writing. Most of the subjects were enrolled in some sort of preschool program, which might have influenced the results. However, very much the same developmental sequence occurs in all subjects. This had been earlier noted by Hildreth in which she presented a detailed gradient of stages in writing from three through five years of age.[7] This development at age three shows a tendency toward horizontal lines with some systematic up-and-down writing through five years when the first name is often printed though with occasional reversals and letter malformations. Some of the writing gradients for six, seven, eight, and nine-year-olds noted by Ames and Ilg have been listed as follows:

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[4] William Stern, *The Psychology of Early Childhood* (New York: Henry Holt and Co., 1926).

[5] Manuel Wolner and W. H. Pyle, "An Experiment in Individual Training in Pitch-Deficient Children," *Journal of Educational Psychology*, Vol. 24 (1933), pp. 602-608.

[6] Louise B. Ames and Frances L. Ilg, "Developmental Trends in Writing Behavior," *Journal of Genetic Psychology*, Vol. 79 (1951), pp. 29-46.

[7] Gertrude Hildreth, "Developmental Sequences in Name Writing," *Child Development*, Vol. 7 (1936), pp. 291-303.

Six years

Circle is now drawn counterclockwise, starting at the top.

Letters are printed usually large and somewhat irregular.

Words are printed by some children at this age. Some reversals of single letters or word order of letter may appear.

Numbers from 1 to 20 or higher usually appear. Sometimes numbers are written upside down.

Seven years

Words: The majority can now write, although an appreciable number prefer to print. The printing is now smaller and more regular.

Names: The majority are now able to write their given name and surname. A minority will still print their name.

Numbers: There is an increase in the numbers written, with the figures now written smaller and in rows.

Eight years

Words: The majority write single words, printing being seldom used. Important individual differences in the writing skill are discernible. Reversals seldom appear.

Names: Nearly all write both their names well spaced, and small letters other than the initial letter of each word. Important variations in style of writing appear.

Numbers: Figures are much smaller and better spaced.

Nine years

Words: Writing is smaller, neater, lighter, more even and slanted, though some still write straight up and down and about one-third still have very irregular letters. Letters are now much better proportioned.

Names: The beginnings of individual style appears, with sex differences being observed. Letters are more evenly made and more correctly proportioned.

Numbers: Writing of numbers is now small and well formed.

EYE-MOVEMENTS IN READING. The early activities involved in learning to read furnish a splendid illustration of the close relationship found between motor and verbal learning. During the early stages of reading the child must develop the habit of focusing the eyes on the left side of the page of reading materials and working from left to right he swings them back to the left side of the page after each line is completed.[8] This learning takes place simultaneously with the growth of word and sentence comprehension. Failure to develop good eye-movements leads to difficulties in reading, and failure to develop good word and sentence comprehension leads to poor eye-movements.

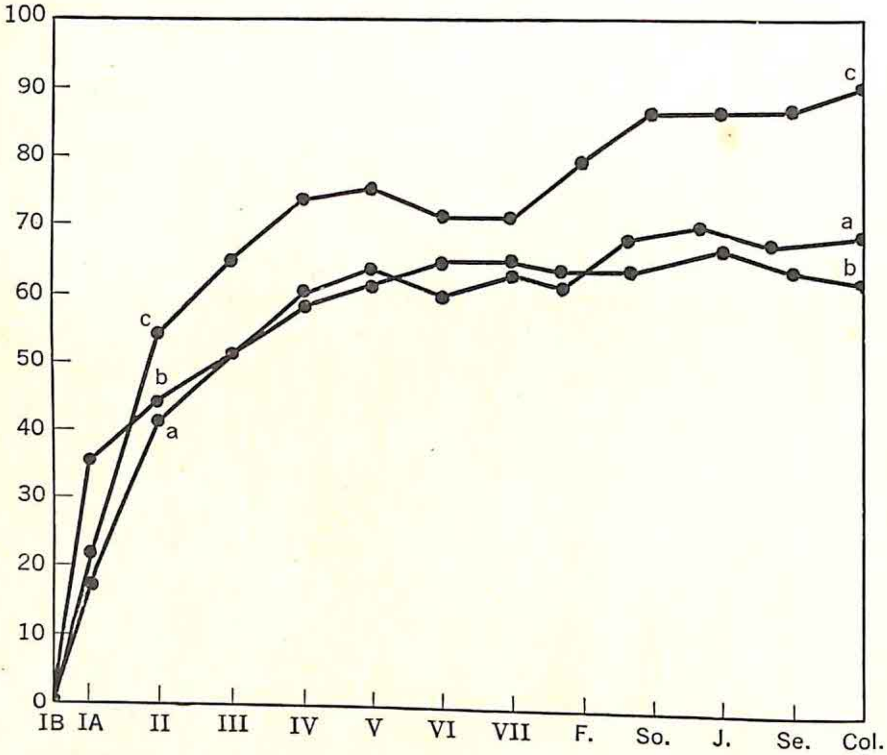

FIGURE 13-2. Per cent of increase in growth for three eye-movement habits—silent reading

School grade shown on horizontal axis; per cent of increase shown on vertical axis. Curve *a* represents average number of fixations per line; curve *b* average duration of fixation pauses; curve *c* average number of regressive movements per line.

Three fundamental eye-movement characteristics have been noted. These are: (1) the number of fixations per line; (2) the duration of the fixation pause; and (3) the number of regressive movements. The importance of these items in the child's development can be seen from curves of growth for these different elements. The three measures of eye-movements were reduced by Buswell to a similar scale and the percentage of increase at the different grade levels computed.[9] The percentage of increase in the successive grades from the median of grade 1B as the base is shown in Figure 13-3. It will be noted that there is little change in the average curves for the

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[8] See A. I. Gates, *The Improvement of Reading,* 3d ed. (New York: The Macmillan Co., 1947).

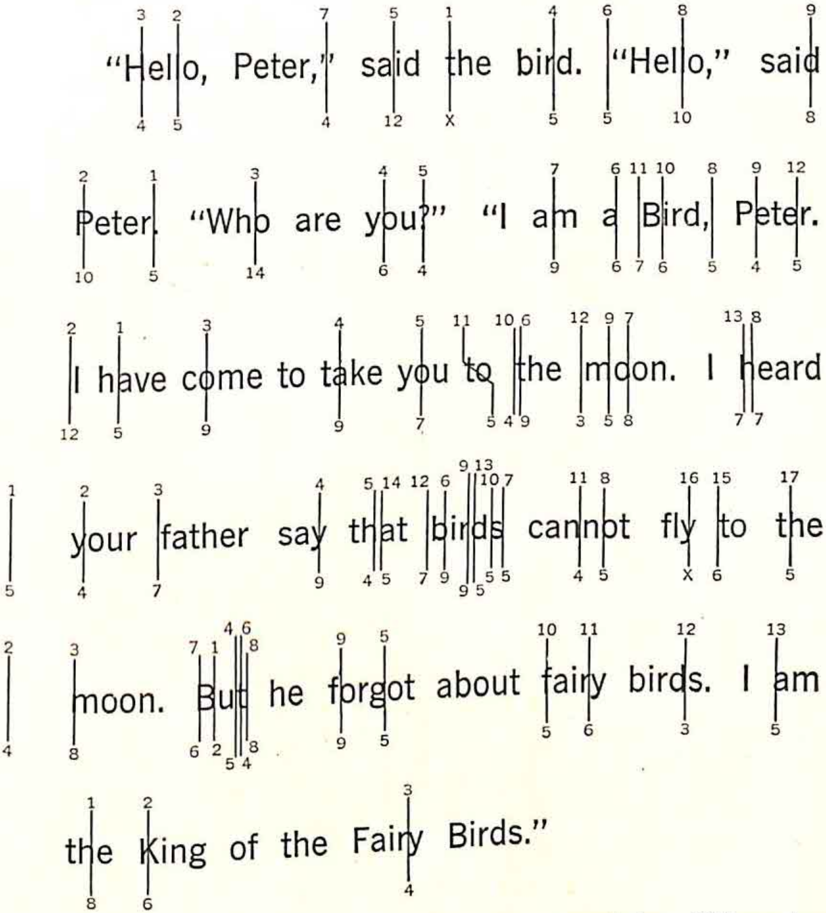
"Hello, Peter," said the bird. "Hello," said
Peter. "Who are you?" "I am a Bird, Peter.
I have come to take you to the moon. I heard
your father say that birds cannot fly to the
moon. But he forgot about fairy birds. I am
the King of the Fairy Birds."

FIGURE 13-3. Photographic record of the eye movements by a fifth-grade pupil in silent reading

number of fixations per line and the duration of fixation after grade 5. Subsequent studies have shown that the first four grades are the crucial ones for the development of desirable eye-movements and good reading skills.

Feeling-motor activities. The feeling-motor activities have also been referred to as manual-esthetic co-ordinations. These activities should not be thought of as functioning apart from vocal skills, manual-tool co-ordinations, and other perceptual-motor learnings. It has already been suggested that manual-tool co-ordinations should be closely correlated with certain fine arts activities. Creative dancing and playing musical instruments have been regarded as manual-esthetic co-ordinations. In these activities the attitudes and feelings of the individual are closely related to his expressed activities. The purpose of the activities is not primarily one of communicating ideas and thoughts, but rather to express one's feelings, ideas, and values. Furthermore, the learner is able through musical activities to express his mood and feelings or the mood and feelings of the composer.

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[9] Guy Thomas Buswell, *Fundamental Reading Habits: A Study of Their Development* (Supplementary Educational Monograph, University of Chicago, 1922), No. 21.

Teaching children to sing simple songs in unison should be the beginning stage of music instruction, and should continue to be a large part of the music program. Music reading may successfully be introduced in the early elementary grades if such experiences are connected with music games and songs that they have already learned to sing in unison. Some types of songs for children that have been suggested are: festival songs, Mother Goose songs, lullabies, songs about animals and birds, Christmas carols, hymns, and songs about children in other lands. Besides singing, many schools are making good use of radio programs and phonograph records as means for developing appreciation of rhythm and music. Rhythm bands, dancing, dancing and skipping to music, and special school programs furnish means for developing motor-esthetic co-ordinations and motivating the work in music.

There is little systematic knowledge as to just when the average child is ready to learn "sight reading" or to play a musical instrument. That type of readiness will be influenced by such factors as intelligence, musical aptitude, and musical background. Individual differences exist, but they are probably no greater here than in other areas of education. Easy to play instruments afford opportunity for enjoyment and may be useful in the development of esthetic-motor co-ordinations and a greater appreciation of music. The use of rhythm instruments at school need not be restricted to the lower elementary grades. It has been observed that such Latin American instruments as the claves, maracas, and bongo drums appeal to the interests of teenagers. Such instruments can be made by the students and used in a variety of learning situations to create an increased understanding of music and the accompanying enjoyment and esthetic-motor development.

Through art activities children may develop a greater appreciation of the world about them and increased esthetic-motor co-ordinations. The elementary-school art program usually includes the graphic and industrial arts. This is today an integrated and fundamental part of the elementary-school program. Through art activities the child is given the opportunity to explore the world about him and relate this to his own inner world of feelings, wishes, and understandings. If he is permitted to explore without too much adult interference and without adult standards constantly being held up for him to reach, he will show an intense interest in art and will grow in self-expression, motor-esthetic co-ordinations, and an increased appreciation of the things he encounters at school and in his community.

FACTORS AFFECTING THE LEARNING OF MOTOR SKILLS

It was pointed out in Chapter 11 that learning curves may be regarded as graphic representations of the rate of progress in learning some function. Analyses of individual learning curves for different motor performances throw considerable light upon the factors and conditions which contribute to success. Some of the most important factors affecting the nature of such curves will be presented in the following discussion.

Importance of maturation. Experiments with music training show that preschool children are capable of profiting from certain types of training.[10] Studies conducted at the University of Iowa show the effectiveness of early training upon the development of singing ability and interest in music. Groups of nursery-school children were given intensive help in the use of the singing voice for an average of ten minutes daily for forty periods. The control group was given no intensive training, but did participate in the music activities in the nursery-school program. There was an accelerated development at all age levels studied in the singing ability of the children given the intensive training. This accelerated development was paralleled by an increased interest and desire to participate in musical training. The results of this study indicate quite clearly that singing ability and musical interest can be stimulated and accelerated as a result of a training program which emphasizes individual as well as group performance and gives special attention to voice placement and ear training for those needing such attention.

An important question of the different aspects of perceptual-motor development then is: How young may a child be and still show definite improvement in the development of the skill as a result of instruction—improvement over and beyond that resulting from maturation and general practice? Dusenberry studied this problem with 56 children as subjects, ranging in age from three to seven years. Two groups of 28 children each were carefully equated. One of these groups was given practice and instruction in ball-throwing twice a week over a period of three weeks, while the other group was used as a control group.

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[10] R. L. Updegraff, L. Hertiger, and J. Learned, "Part III. The Effect of Training on Singing Ability and Musical Interest of Three-, Four-, and Five-year-old Children," *Studies in Preschool Education, University of Iowa Studies in Child Welfare, New Series,* Vol. 14 (1938), pp. 83-131.

The children were found to vary greatly in their manner of throwing a ball. In general the boys made better use of their bodies than did the girls and had more advanced arm and hand movements in executing the throwing. As can be seen from Table 13-1, both the practice and control groups made gains in average throwing scores from the intitial to the final test.[11] There is, however, a significant difference in the gains of the trained groups over those of the control groups. The boys improved more in distance-throwing skills than the girls with the same amount of training. Radical changes in style of throwing were sometimes accompanied by power performance. However, the most marked change in throwing style due to training was found in stance. This is noteworthy for those concerned with guiding children in the development of motor skills. The importance of good form in the development of simple motor skills is indicated from the results of this study.

TABLE 13-1. *Differences between beginning and final throwing averages*

GROUP	THROWS IN FEET		GAINS	
	INITIAL	FINAL	FEET	PER CENT
Trained (Boys)	24.0	30.0	6.0	25
Control (Boys)	23.5	26.5	3.0	12.8
Trained (Girls)	16.3	18.4	2.1	12.7
Control (Girls)	15.7	16.0	.3	2.1

There is much evidence, however, that training given at too early an age is largely ineffectual in promoting the development of motor skills. This is shown in a study by Hicks.[12] Children from two and one-half to six years of age were given eight weeks of training in throwing a ball at a moving target. Such training produced no greater gains in the skill than were produced in a control group through structural maturation and general practice. There are skills which should be delayed in order that the child will mature sufficiently to acquire the best methods of performing such skills. However, the gains to be derived from deferred pratice do not continue indefinitely.

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[11] Lois Dusenberry, "A Study of the Effects of Training in Ball Throwing by Children, Ages Three to Seven." Reprinted from *The Research Quarterly*, Vol. 23 (1952), pp. 8-14. Copyright, 1952, by the American Association for Health, Physical Education, and Recreation, Department of the National Education Association, 1201 Sixteenth St., N. W., Washington 6, D. C.

[12] J. A. Hicks, "The Acquisition of Motor Skill in Young Children," *Child Development*, Vol. 1 (1930), pp. 90-105.

Metropolitan Life Insurance Company

The development of sensori-motor skills is dependent upon both maturation and learning

Too long a period of delay may be detrimental rather than helpful. This may be observed in such motor skills as those found in acrobatic dancing. Also, in learning to speak a foreign language the younger child is at an advantage, since the organs involved in speech are still flexible. The lack of a social need for such a language among most elementary-school children limits the introduction of it in the elementary-school program.

Experiences in the schools of Europe and certain cities in America have proved that elementary-school pupils are capable of learning a modern language, and because of their imaginative capacity and play-spirit, can be readily motivated in the learning process. It is a psychological fact that elementary-school children are able to easily learn new languages idiomatically. Furthermore, it is much easier to develop the correct pronunciation at this stage. The elementary-school child is a ready imitator and will acquire skill in pronouncing the words the way the instructor does in a somewhat automatic manner. The adult is likely to persist in pronouncing words according to fixed habit patterns acquired in pronouncing words of his native language. If, therefore, easy and natural pronunciation is the principal aim of modern language instruction, such instruction should begin during the early elementary-school years.

Sex differences. Sex differences in motor performances may be observed among kindergarten and early elementary-school children. A group of motor achievement tests was administered by Jenkins to 300 children enrolled in the public schools of Montclair and Englewood, New Jersey.[13] These children were distributed into age groups of five, six, and seven years. There were fifty boys and fifty girls in each age group. The results from the various tests are presented in Table 13-2. In the abilities tested, the boys were, in general, superior to the girls, except for the fifty-foot hop. There was, furthermore a gradual and consistent improvement observed during the three-year period. However, any differences noted in vocal skills will be in favor of girls.

TABLE 13-2. *Average scores obtained by five-, six-, and seven-year-old boys and girls in certain motor performances*

	FIVE-YEAR-OLDS		SIX-YEAR-OLDS		SEVEN-YEAR-OLDS	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
Running Broad Jump (Distances in inches)	34.40	28.60	45.20	40.00	58.80	50.80
Standing Broad Jump (Distance in inches)	33.70	31.60	39.30	38.00	42.20	41.00
Jump and Reach (Vertical distance in inches)	2.52	2.22	4.02	3.48	4.98	4.28
Thirty-five-yard Dash (Time in seconds)	9.30	9.70	8.52	8.84	7.92	8.02
Fifty-foot Hop Without Error (Time in seconds)	10.82	10.33	9.20	8.89	8.81	7.59
Baseball Throw (Distance in feet)	23.60	14.50	32.80	17.80	41.40	24.40
Baseball Throw at 10-foot Distant Target (Error in inches)	8.87	16.90	5.40	13.17	4.20	8.50

A study by Husband and Ludden was designed to compare sex differences of adults in learning motor skills.[14] Ten subjects of each sex were given six series of five trials each on two motor tasks: the *Pursuit Rotor* and *Spool Packing* tests. The *Pursuit Rotor* test consisted of following with a loose-hinged pointer a small target rotating near the outer edge of a phonograph turn-table. The *Spool Packing* test was more complex in nature. The task involved taking a spool in each hand and placing them end to end in a tray until the tray was filled. The tray was then slid along and another tray brought into position to be packed. One trial consisted of filling five trays of spools. The score was determined by the time taken for each trial.

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[13] L. M. Jenkins, *A Comparative Study of Motor Achievement of Children of Five, Six, and Seven Years of Age* (Teachers College, Columbia University, Contributions to Education, 1930), No. 414.

[14] Richard W. Husband and Margaret J. Ludden, "Sex Differences in Motor Skills," *Journal of Experimental Psychology*, Vol. 14 (1931), pp. 414-422.

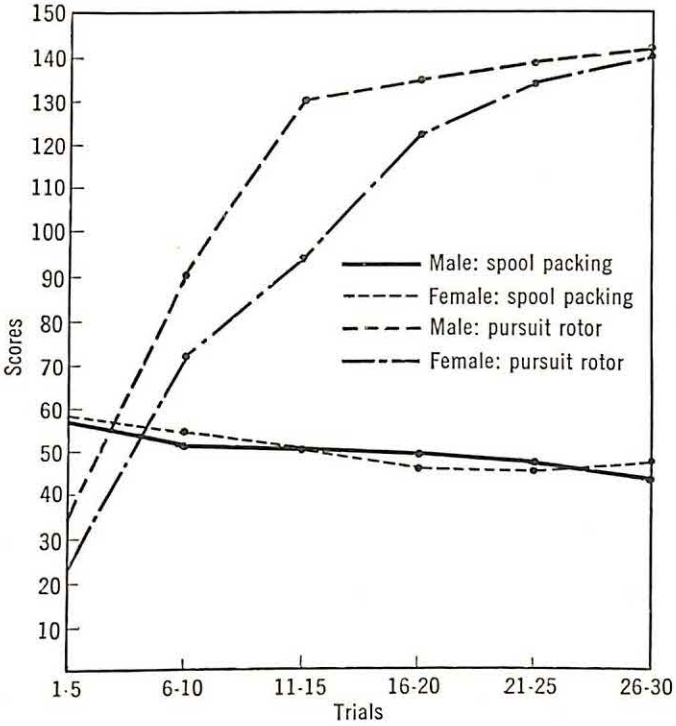

FIGURE 13-4. Average scores obtained by ten women and ten men on the *Pursuit Rotor* and *Spool-Packing Training Series*

The results for the men and women on these training series, shown in Figure 13-4, revealed that no consistent sex differences appeared with learning, although the men were significantly superior to the women on the first trials of the *Pursuit Rotor* test. The evidence from this study points in general to an approximate equality of the sexes in learning the motor abilities tested.

Learning the task as a whole. In Chapter 11 it was stated that learning is usually more efficient when the learner grasps the major relationships. The whole, when understood, gives meaning to the parts. After one has gotten the general pattern of the general plan of a city, such as Washington, D. C., it is easier to learn the general location of important buildings and parks of the city. Formal training on specific items of a task may be very helpful in overcoming a special difficulty. This was early referred to by Pechstein as a modified whole method or a part-progressive method.[15]

Studies by Rubin-Rabson show that an analysis of piano material preliminary to a complete memorization of the keyboard is superior to confining all the learning to the keyboard.[16] It has been suggested that piano students should prepare by thorough analysis an amount of material commensurate with their experience and ability and follow this with practice at the keyboard until the motor skills and tonal patterns have become established. This may then be followed with mental rehearsal practice until the mental performance can be accomplished. This study emphasizes the importance of attention and grasping the materials as a large unit in the final accomplishment of a motor task.

Experimental results, although favoring the whole method of learning, do not permit a simple and generalized statement of the relative efficiency of the two methods as applied to perceptual-motor learning. Even when learning the same type of material, the results vary from person to person. These is some evidence that the more capable students are likely to do better with the whole method. Certainly the size of the unit should vary with the general capability of the learner. This was noted in a study by Lemke involving motor-esthetic learning.[17] His study was concerned with the improvement in playing the violin through instruction in phrasing. The importance of distinguishing the rhythmical phrases in the interpretation of music is analagous to the value of punctuation and accentuation in written and oral expression.

Two groups of intermediate-grade students were used as subjects in the study by Lemke. The experimental group was given instruction in phrasing three periods a week for ten weeks, while the control group was given no such instruction. The experimental group was given the task of perceiving and executing this smallest unit, in contrast to a larger measure of unit which beginners are usually taught. The experimental group showed marked improvement over the control, which was reflected not only in phrasing but also in tone, time, pitch, and technique. The conclusions drawn from this and other studies bearing on the whole-part method of learning may be summarized as follows:

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[15] L. A. Pechstein, "Whole Versus Part Methods of Learning," *Psychological Monographs,* No. 99 (1917).

[16] Grace Rubin-Rabson, "Studies in the Psychology of Memorizing Piano Music. VI: A Comparison of Two Forms of Mental Rehearsal and Keyboard Overlearning," *Journal of Educational Psychology,* Vol. 32 (1941), pp. 593-602.

[17] Leo Lemke, "Improvement in Playing the Violin Through Instruction in Phrasing," Ph.D. Thesis (University of Michigan, 1949). The fundamental basis of music interpretation is phrasing or the grouping of notes.

1. No one method is superior for all learners.
2. In general, students should be given an orientation to the problem before practicing special details.
3. The size of the learning unit should be influenced by the maturation and capability of the learner.
4. In complex perceptual-motor tasks it will most likely be desirable to give special attention and practice to the difficult parts.
5. The attention of the learner should be focused upon the task as a whole and perceptual cues rather than specific movements to be made.
6. Attention should be given to the total performance of the task, leaving the "rough edges" to be smoothed out later as a result of additional practice.

The effects of practice. The importance of adequate spacing of practice periods was emphasized in Chapter 11. This is most important in connection with the acquisition of motor skills. In general the practice periods should be short and well-spaced at first, though not so short that the learner will be unable to grasp the act as a unit. In the precision stage, longer and more numerous practice periods may be employed. A study by Fulton attempted to compare the effect of placing emphasis on speed and accuracy in the initial stages of a training period of a ballistic movement.[18] Results obtained from a comparison of two equated groups given fifteen training periods at the rate of two a week revealed no significant differences in speed of the strokes at the end of the training period. However, the group emphasizing speed developed accuracy to a greater extent than the group which made accuracy of stroke the primary aim.

The importance of practice in the development and fixation of a motor skill will also depend upon the motivation of the learner. Practice as mere repetition may create unfavorable attitudes toward the task and thus act as a barrier to the development of a high state of efficiency. This may be noted in the case of typewriting. The student who finds the practice periods unpleasant will not reach as high a level of performance as he would be able to reach if he were adequately motivated. This is one of the dangers found in "overlearning." When practice is carried to the point where it is distasteful to the learner, or when it is carried on in a repetitive fashion only, efficiency in learning will be adversely affected. The value of overlearning is largely dependent upon the motivation of the learner and the optimal distribution of the practice time.

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[18] Ruth E. Fulton, "Speed and Accuracy in Learning a Ballistic Movement," *Research Quarterly*, Vol. 13 (1952), pp. 30-36.

The value of learning a motor skill in the manner in which it is to be eventually used is illustrated in an experiment conducted by Barlow with two groups of college students as subjects.[19] One group of students, after making a keyboard chart and getting an understanding of the shift of the carriage was taught by the use of comprehensive units of materials for typing, while the other group used a process of beginning with meaningless letter-symbol combinations involving *a s d f* for the left hand *j k l* for the right. After these were mastered additional letters and syllables were introduced, so that the entire keyboard was brought into use when the fifteenth lesson was reached. The group which practiced the comprehensive units was significantly superior to the other group at the end of the experiment in the number of letters written during a particular practice period. These results support the theory that learning materials in a natural setting is superior to a synthetic device of practicing on meaningless and unrelated materials.

GUIDANCE IN THE ACQUISITION OF A MOTOR SKILL

A comparison of the abilities of instructed and noninstructed individuals at such tasks as writing, typing, swimming, skating, and other motor tasks varying in degree of complexity will show the value of guidance in the learning of such tasks. The learner left to himself will adopt the first method he stumbles upon which appears to work satisfactorily. The most effective method is likely to seem awkward at this stage, and the best immediate results are not obtained from using it. The instructor has the responsibility of knowing what are the best methods and how they can best be acquired.

Evidence of the value of guidance. Evidence of the value of guidance may be observed in connection with the learning of such motor skills as swimming and boxing or in more complex co-ordinations such as those found in typewriting. An individual left to himself in learning to swim will likely develop some such stroke as that referred to as the "dog-paddle," whereas a capable swimming instructor would insist upon the development of a "crawl" stroke, if the maximum efficiency is to be reached. The cramped style of typewriting noted in the "hunt-and-peck" system of typing will be replaced by a "touch" system, when an instructional program of learning typewriting is followed.

One of the most complete studies of this problem was conducted by

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[19] J. W. Barton, "Comprehensive Units in Learning Typewriting," *Psychological Monographs*, Vol. 35 (1926), No. 164.

Dorothy Davies with two groups of college girls as subjects.[20] The members of one group were given regular and systematic instruction in the technique of archery, while the members of the second group practiced archery under the observation of the experimenter, but without instruction. The two groups were considered at the start of the experiment to be equally able to acquire the skill in archery. The experimental period included eighteen practice periods during which arrows were shot and scores recorded. The average learning curves for the two groups, presented in Figure 13-5 shows a sharp initial rise in performance from the first through the eighth or ninth practice periods.

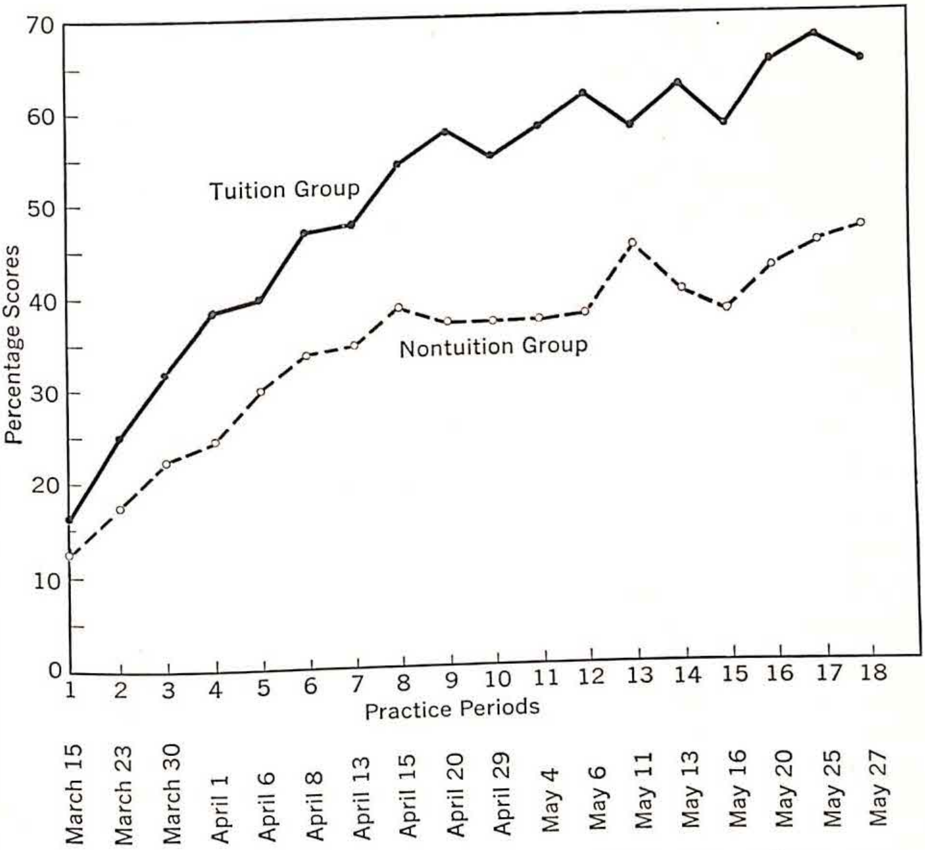

FIGURE 13-5. Daily average percentage scores for the two archery groups

The tuition group was given instruction prior to the first trial, and was superior to the noninstructed group from the beginning. This superiority increased throughout the course of the experiment. The results of this study support the notion that instruction in technique of performing a complex motor skill aids the learner in learning the skill and in the development of a higher level of proficiency. The educational implications of this study are clear. They may be summarized as follows:

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[20] Dorothy R. Davies, "The Effect of Tuition upon the Process of Learning a Complex Motor Skill," *Journal of Educational Psychology*, Vol. 36 (1945), pp. 352-365.

1. Teaching a motor skill takes advantage of the learner's capacity for intellectual analysis of the problem and thus increases the rate of learning.
2. Instruction tends to prevent the learner from early falling into a set pattern below his potentialities.
3. Through instruction the learner's attention is directed to more adequate techniques than those which he has probably been using. Thus, the learner is guided and stimulated in eliminating faulty techniques in favor of better techniques. This enables the learner to reach a higher level of proficiency.
4. Through instruction the teacher promotes the growth of intellectual insight on the part of the learner into the factors related to success and into the nature of the skill.

Positive versus negative guidance. One may observe positive guidance in the development of such a skill as handwriting. The learner is instructed about the way of holding the pen and the position for placing the paper on the desk. A negative instance appears when special errors are pointed out to the learner and he is instructed to avoid such errors. When the emphasis in typewriting is upon the errors made there is negative guidance used; whereas an emphasis upon the correct movements is regarded as positive guidance. A study by Holodnak was designed to compare the effectiveness of positive and negative guidance for maze learning in children.[21] Sixty-four children ranging in age from six to ten years were used as subjects in maze learning. Positive guidance consisted of informing the children whenever a correct response was made; while negative guidance consisted of informing them when an incorrect response was made.

The results of the study are presented in Table 13-3. On all three criteria of errors, trials, and time the learning with positive guidance was superior to that with negative guidance. The difference in favor of positive guidance was greatest with the youngest, the six-year-old group. It is also worth noting that the performance of the girls surpassed that of the boys with respect to errors, trials, and time. These results are in harmony with those of other experiments using mazes and other simple motor tasks.

[21] Helen Barbara Holodnak, "The Effect of Positive and Negative Guidance upon Maze Learning in Children," *Journal of Educational Psychology*, Vol. 34 (1943), pp. 341-354.

TABLE 13-3. *A comparison of the average number of errors, trials and time for positive and negative conditions*

	POSITIVE			NEGATIVE		
	ERRS.	TRS.	TIME	ERRS.	TRS.	TIME
Boys	27.07	12.34	283.87	36.78	16.93	395.52
Girls	24.71	11.06	265.20	29.40	12.63	315.97

Importance of mental practice. Closely related to the problem of guidance in learning a motor skill is that of mental practice of the act. The question may be raised: Will it help the learner to go through a motor performance, such as a dance, mentally? A study by Vandell, Davis, and Clugston was concerned with this problem.[22] The motor skill used in their study consisted of (a) throwing steel-head feathered darts at a circular target mounted on a wooden frame at the eye level, and (b) free throws using a regulation basketball and the conventional basket and floor markings. The subjects were divided into three groups, with the function of each group during the 20-day testing period described as follows:

Group I—actual practice trials on the first and twentieth days with no directed practice of any kind between these days.

Group II—actual physical practice trial on each of the twenty days.

Group III—an actual physical practice trial on the first and twentieth days and mental practice at the performance of the tasks from the second through the nineteenth day.

TABLE 13-4. *A comparison of the scores of the three groups*

GROUP	INITIAL SCORE	FINAL SCORE	PER CENT OF GAIN OR LOSS
Group I	1,329	1,324	0
Group II	1,275	1,578	23
Group III	1,036	1,330	22

The results for the three groups of college students are presented in Table 13-4. These findings indicate that mental practice is beneficial in the improvement of a motor performance. It seems likely that part of the time given to instruction in typewriting, handwriting, and certain practical arts could be effectively used as a mental practice period in performing the task.

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[22] R. A. Vandell, R. A. Davis, and H. A. Clugston, "The Function of Mental Practice in the Acquisition of Motor Skills," *Journal of General Psychology*, Vol. 29 (1943), pp. 243-250.

The use of models and demonstrations. A demonstration by the instructor or in some other manner of the nature of a motor skill enables the learner to perceive the task as a whole. The learner must know in general what is to be done and how it is to be done. Demonstrations are valuable devices in the introduction of new materials and techniques. On the secondary-school level visual aid materials may be most useful. However, the value of such devices will depend upon the extent to which the learner has been prepared for them, the motivation of the learner, the clarity of the demonstration, and the instructional procedures following the demonstration. The work should be organized in such a way as to proceed from simpler materials and problems to more complex ones, being kept within the scope of the learner's maturation and experiences, all the time.

Essentials in guidance. The first requirements of one who guides another in the learning of a perceptual-motor skill is to know the characteristics of a good performance. For example, the teacher of archery should first of all be an expert in archery himself and know how the learner can best acquire such a perceptual-motor skill.

Much of the criticism of instruction in handwriting stems from the fact that although the skill improves with practice during the elementary-school years, it rapidly declines during the later school years.[23] The reasons for this rapid decline may be listed as: (1) absence of guided practice, (2) lack of social pressure, (3) less favorable conditions for writing, such as the use of the knees and lap, (4) increased demand for writing in the upper grades with a resultant emphasis upon speed.

Certain precautions should be observed in guidance in the acquisition of motor skills. Pupils should be given the opportunity to try out different techniques, to explore, and sometimes to blunder. However, guidance should be introduced before the learner has acquired undesirable habits of performing a particular task.

Motivation is most important in all perceptual-motor learning. The problem of motivation is, however, simpler in such learning than with verbal types of learning. The learner is able to see the results of his efforts more readily. He is also able to set up more specific goals. These conditions also tend to make it easier for the learner to recognize his deficiencies. Those concerned with guidance in such learnings should keep criticism to a minimum during the early stages. The learner needs encouragement, lest he develop an autocritical attitude toward his performances. Self-confidence is most important if the learner is to make the optimum progress in the acquisition of a motor skill.

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[23] Beulah P. Beale, "Trends in Handwriting," *Baltimore Bulletin of Education,* Vol. 20 (1944), pp. 29-32.

The most serious mistake encountered in guiding the aesthetic development of the child is the great emphasis placed upon factual knowledge or expert performance on the part of the child. This may be noted in the development of appreciation for music. If the emphasis is upon the names of composers, their biographies and the dates when they lived and wrote, the learner may find the experiences very dull. Also, if emphasis on learning to play the piano is upon "do, rah, me," and correct finger and hand movements, there will be little in such experiences that challenge the interests and needs of the individual learner. There is good evidence that when children are guided in expressing their feelings through the dance or music learning is enhanced.

The elementary schools have in general been more successful in teaching the arts than have the secondary schools. Elementary teachers are more committed to methods which place emphasis upon the individual child rather than special skills or units of subject matter. A few, however, have at times confused creativeness with freedom of action. It should be pointed out that creative work must be motivated and directed. It is the manner and extent to which the work is directed that will determine whether or not the activity is an expression of the learner or a response to the directions of the instructor. The setting forth of adult patterns and adult standards for immature learners tends to destroy the interest, initiative, and creative desire of the learner.

SUMMARY AND IMPLICATIONS

The broad categories of motor skills are presented in this chapter: object-motor activities, language-motor activities, and feeling-motor activities. Object-motor activities include the use of tools and are an important part of a modern elementary school program. The language-motor activities include movements of the speech organs, drawing activities, reading, and other motor movements involved in the use of language. These make up a fundamental part of the school program and are basic to the intellectual and social development of the pupils. Feeling-motor activities do not operate to the exclusion of these other motor skills. However, in these activities the attitudes and feelings of the individual are clearly related to his expressed activities. Readiness and sound principles of learning are applicable to the learning of these as well as the other categories of motor skills.

There is good evidence that most children are not given training in the different motor skills commensurate with their abilities and needs. The guidance of the child's development of perceptual-motor skills should be an integral part of the school program. The principles of learning, referred to in Chapter 11, are applicable to the acquisition of these skills. These include:

1. The choice of activities in harmony with the maturational level of the learner.
2. Setting forth purposive learnings and goals.
3. Organizing activities and learning experiences in relation to the needs, interests, and aspirations of the learner.
4. Providing opportunity for the child to explore as well as guiding him in his learning activities.
5. Keeping criticism, especially auto-criticism, to a minimum.
6. Integrating the perceptual-motor learning with other aspects of the child's development—providing for the all-around development of the child.

Questions and Exercises

1. Give an example to show how specific training is dependent upon the stage of maturation of the individual learner. What fundamental principle is here involved?
2. Show how the acquisition of perceptual-motor skills contribute to the all-around development of the child.
3. What factors should be considered in the matter of spaced practice periods for perceptual-motor learning?
4. Discuss the role of "criticism" and "self-criticism" in perceptual-motor learning.
5. Cite evidence from your observations which tend to disprove the general notion that girls are inherently inferior to boys in the acquisition of perceptual-motor skills.
6. How do the motor abilities of the adolescent differ from those of the elementary-school child? Be specific.
7. List some motor skills acquired by most children before they are of kindergarten age. What are some factors upon which such skills depend?
8. Show how a particular movement made separately is not the same as when it is made as a part of a larger movement pattern.
9. What are some conditions largely responsible for the loss of interest of children in many esthetic-motor skills as they grow towards adolescence?
10. Differentiate *positive* and *negative* guidance. Evaluate the merits of each.

11. Discuss the use and abuse of certain special devices used to guide the individual in the learning of a perceptual-motor task.

Recommended Readings

Cronbach, Lee J., *Educational Psychology* (New York: Harcourt, Brace and Co., 1954), Chap. XII.

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: The Macmillan Co., 1948), Chap. XIII.

Jersild, Arthur T., *Child Psychology,* 3rd ed. (New York: Prentice-Hall, Inc., 1946), Chaps. III and IV.

Lindsey, L., *The Nature and Conditions of Learning* (New York: Prentice-Hall, Inc., 1946), Chap. XI.

Millard, Cecil V., *Child Growth and Development in the Elementary School Years* (Boston: D. C. Heath and Co., 1951), Chap. V.

Ragsdale, C. E., "How Children Learn the Motor Types of Activities," *Learning and Instruction,* Part 1, *Forty-ninth Yearbook of the National Society for the Study of Education* (Chicago: University of Chicago Press, 1944), Chap. III.

Skinner, Chas. E., *Educational Psychology,* 3rd ed. (New York: Prentice-Hall, Inc., 1951), Chap. X.

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), Chap. XII.

Thorpe, Louis P., *Child Psychology and Development* (New York: The Ronald Press Co., 1946), Chap. X.

Trow, William C., *Educational Psychology,* 2nd ed. (Boston: Houghton Mifflin Co.), Chap. XV.

CHAPTER 14

Knowledge and Understanding

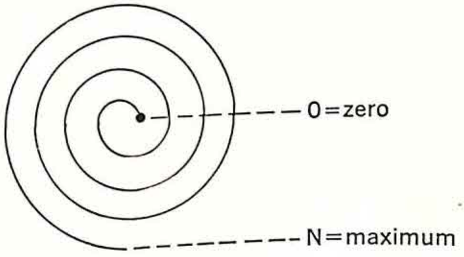
THE CHILD'S NOTION about the things around him are an outgrowth of his experiences. When he enters school he brings his past with him. At school he is taught that the letters "dog" represents an animal which he has encountered perhaps in his play experiences. At a later stage he is confronted with number symbols, which stand for quantitative relations, many of which have been part of his past. In history and science he gathers information and this is integrated with ideas which he brought with him to the classroom. On the basis of information acquired in and out of school he is able to understand and better interpret the various aspects of his culture. Instances and characteristics of these kinds of learnings will be discussed in this chapter around the general topics (1) acquiring meanings, (2) acquiring concepts, and (3) the acquisition of generalizations.

ACQUIRING MEANINGS

The nature of meaning. To each experience we tend to attach a meaning. Someone speaks to us. What does he mean? We look at a picture of a child crying. What is the trouble? We learn that a certain signal by a driver of an automobile means that he is going to make a right turn. The lists of meanings acquired will vary with individual experience. They are many in number and relate to all phases of life.

The general structure of an experience is easier to learn when the materials making up the structure are meaningful. Thus, meanings are beneficial in acquiring new meanings. There is considerable evidence based upon experiences as well as scientific investigations that children learn to read, write, and spell better when they are confronted with meaningful and vital materials. Children in the second grade learn to spell such words as Easter, Christmas, and Santa Claus—words meaningful and significant in their lives. The word *play* will be recognized more readily than the word *plot*, because of its being more meaningful. Words have meaning because of the individual's experiences with what they stand for. They are in themselves abstractions. They are symbols that may be repeated by rote, or may be learned in connection with particular objects, situations, or conditions. It is possible, however, that a particular word may have different meanings to various individuals because of differences in their experiences with the thing the word symbolizes.

There are endless degrees of meaning involved in an ideational learning task or situation. This is illustrated in the following diagram.



At the center, near the zero-point, is the learning task, well-nigh meaningless. The meager knowledge that George Washington was one of our presidents would approach this point, while an understanding of his native background, exploits as a general, and his viewpoints and activities as the first president of the United States would be represented somewhere nearer the outer-rim of the circle. The illustration is intended to show that one's knowledge and understanding grows gradually from the beginning point near zero.

There is perhaps no limitation placed on the meaning attached to a particular stimulus-object or situation. Any limitations would result from the native ability, dynamics, and experiences of the learner. Furthermore, there is nothing to determine to what degree a particular learning task should be learned. Just how much should one learn about George Washington? How much knowledge does one need about the true meaning and significance of the information in mathematics that two times five equals ten. Simple facts learned in arithmetic are seldom learned beyond the point of the arbitrary associations acquired. Teachers need to reckon with the problem of how far on the continuum of meaningfulness should be the goal in the learning of a particular task. Certainly materials regarded as very important should be learned more thoroughly and be made more meaningful than less important materials.

The development of meanings. There are two widespread misconceptions about the development of meanings which should be carefully considered. In the first place some people are inclined to identify all meanings with words. This has probably arisen as a result of the meanings acquired at school. Certainly books, lectures, and class discussions are important in the development of meanings. Modern education, however, takes advantage of other media for the development of meanings, and meanings have important bearings outside of words. The child experiences running, jumping, and climbing. Studies of deaf children show that meanings are not absent, even though the acquisition of words may be *nil* or almost *nil*. The second misconception consists of thinking of the acquistion of meanings as separate and distinct from all other kinds of learning. This arises from attempts to divide learning into three or more main types. It was pointed out earlier that such divisions are practical ones made for the sake of convenience. All these types are clearly interrelated. This may be noted in connection with the meaning of the word *knife*. Such a meaning will include all of one's experiences with a knife, including motor activities involving its use and attitudes acquired toward a knife.

Differentiation and integration are essential for the formation of meanings. In the development of the meaning of knife the child develops the ability to distinguish between a knife and other objects. Integration may be observed as the child comes to understand the function of the knife and such an understanding becomes a part of his total knowledge and understanding.

It should be emphasized that all meanings grow out of experiences. Words encountered in reading have meaning in accordance with our experience. Children who have had only one meaning of a word find it confusing when the word is given a different meaning. For example, the word *pitch* may have a single meaning with reference to baseball. It is confusing to the child when he first encounters it in connection with music. An important task in the teaching of meaning is to make sure that there is no gap between the experiences of the child and the words he meets in the textbook and classroom.

Importance of cues. One of the features involved in learning is that cues are established which affect one's response to a situation. At first the individual responds to the whole situation, such as an airplane. After experiencing various situations involving airplanes he is able to respond to some specific aspect of the situation as if it were the whole pattern. The pattern (cue) may be that of the propellers, or the noise of the airplane as it moves through the air. This reduction of the necessary stimulation to that of some single part of it is the essence of *perceptual learning*. These parts of the situation which provoke the meaningful response are termed "cues."

Although cues are important in determining the response the learner will make, they always operate within the framework of his experiences. Thus, there will be a growth in the meanings attached to cues, in harmony with the maturation, experiences, and motivation of the learner. Perception of distance, size, time, shape, and the like are all improved through training. It is through experiences involving size and shape that the child learns to react to cues which enable him to respond more accurately to objects varying in size and shape. Guidance in the functional relationship of a particular cue to size or shape facilitates the growth in perception.

The use of symbols. Symbols may be defined as objects or activities which stand for something other than, and usually more important than, themselves. They are frequently parts of objects or of activities which are used as stimuli to bring about the response that would be brought about by the original object or act. Cues may be thought of as simple forms of symbols. However, symbols are usually somewhat detached from the object or situation which they represent. Language represents the most important class of symbolic activities. It is through language that man is able to do such an enormous variety of things, involving short cuts to action. The development of language and of number concepts is essential to the development of an individual's thinking process; for without such symbols he would be unable to transcend time and space in his thinking and action.

It was pointed out in Chapter 6 that language development does not take place automatically. Language itself is not a part of man's innate equipment. Its development depends upon maturation and upon experiences with functional and concrete objects and events. It is through language that the child is taught the customs of people in other parts of the world. It is through language that he is able to grasp ideas in science which he has not had the opportunity to experience. Thus, it is apparent that language, serving as symbols of cultural experiences and phenomena, is an instrument of primary importance in the educational process.

Reading readiness. Educational experiences during the past centuries show that most children can learn to read at the age of six. The question of the advisability of beginning reading at this time has come to the forefront in recent years. A controlled experiment bearing on this problem was begun in the Winnetka Public Schools in 1932, using as subjects 25 children entering the first grade. Each child was matched with three control children from a similar home background and the same mental and chronological ages. The experimental group was not exposed to direct instruction in reading, number work, and writing. The teacher did read stories to these children when they requested them.[1] Their activities were informal, comprising dramatic play, excursions, construction, group play, and the like. The control group had somewhat similar experiences, with the exception that one-third of the time was given to systematic instruction in reading, number work, and writing. This experiment was continued for five years with periodic appraisals of their reading ability by means of tests. Although the number of members of both the control group and experimental group became smaller during these seven years, curves of growth in reading for the two groups are revealing. These have been constructed by Olson and are reproduced in Figure 14-1.[2] The results of this study indicate that delayed instruction in reading may result in greater achievement in the upper elementary grades. Unquestionably the child's experiences during this period

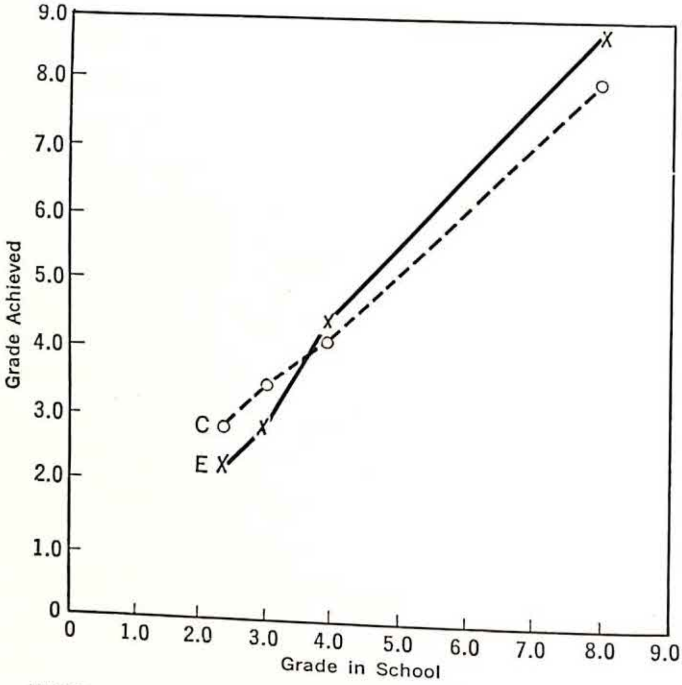


FIGURE 14-1. Comparison of achievement of experimental group with delayed instruction with achievement of control group with usual instruction

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[1] Mabel V. Morphett and Carleton Washburne, "Postponing Formal Instruction: A Seven-year Case Study," in *The Effect of Administrative Practice in the Character of the Education Program—Symposium* (Washington: American Educational Research Association, 1940).

[2] Willard C. Olson, *Child Development* (Boston: D. C. Heath and Co., 1949), p. 151.

of delay are very important in this connection. Many pupils are unprepared by their experiences to understand much of the reading materials upon entering school. Story telling, playing games, listening to stories, and other social and language activities in the kindergarten and first grade tend to make for reading readiness.

Due to immaturity and emotional instability some children will need a definite program designed to develop reading readiness through the first half of Grade 1, while other children will need such a program throughout the first grade. Gesell has suggested that the child who is to be subjected to training in reading should show all or most of the following traits to a degree equal to that of the average child six to six and one-half years of age:

1. Normal (or corrected) vision
2. Normal hearing
3. General mental level of 6 to 6½ years
4. Good motor co-ordination, particularly manual control, as evidenced in drawing
5. Relatively mature personality
6. Normal use and comprehension of language
7. Articulation not more than slightly immature
8. Relatively even development in the various fields of behavior
9. Interest in, and ability to follow, stories of moderate length
10. Ability to control attention on set tasks
11. Ability to adjust to the requirements of schoolroom routine.[3]

Learning to read. Children progress more readily in learning to read when they begin with words in their oral vocabulary which reflect their experiences. When a child encounters the written word *horse,* he should already know the spoken word, and this will enable him to associate his experiences with it. The printed word *horse* may be identified with the object horse, the horse as observed in the movies, or the meaningful spoken word horse. The learning in either case is based upon association of the printed word with certain meanings which the learner possesses. This ability to associate and remember enables the child to build up a reading vocabulary. Eventually he is able to get meaning directly from the printed words without the intermediary of the spoken words.

In earlier periods of our schools the child was taught the alphabet first, and the reading of words was acquired by a sort of spelling process. The notion that meanings occur in connection with larger units and patterns was not generally understood. The developmental traits of children and their reading activities are related in two ways:

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[3] Arnold Gesell, *The First Five Years of Life* (New York: Harper and Bros., 1940), p. 209.

1. The characteristics, needs, and activities of children at different levels of their maturity influence what they should be taught in reading.
2. Reading activities influence the general nature of children's development by stimulating the enlargement of their abilities and interests and by affecting their personal and social adjustments.

The first relationship emphasizes the developmental characteristics of children as factors which influence the reading program, the second relationship stresses the influence of the reading program on the development of children. There is however an interrelationship here which the teacher of reading should recognize. Evidence will be presented in a later chapter to show that poor reading achievement is often an important factor in the personal and social adjustments of the individual learner at school. After an examination of many research studies, Russell summarized six important psychological principles pertaining to reading:

1. All children go through similar stages of development as their reading abilities mature.
2. Development of reading abilities is a continuous and gradual process.
3. Although children go through similar patterns of continuous development there is a wide variation in the times individuals reach certain points in reading achievement.
4. Although reading is a continuous development, at various levels different needs and interests tend to accelerate certain phases of growth in reading abilities and attitudes.
5. In general, there is a positive relationship between reading achievement and general physical, mental, and social development, and among the various reading achievements themselves.
6. The effect of environmental influences related to reading varies with the stage of maturation reached by the child.[4]

ACQUIRING CONCEPTS

Successful advancement in the field of human learning involving understanding and problem-solving would be impossible without concepts as tools of thought. A concept is more than a specific object or situation associated with a word. The concept of "Mountain" is not restricted to some particular mountain, but applies to a type of land condition which may be found in many different places. The child whose experiences have been limited to a single mountain, has no concept of "Mountain," or any concept he has will be very limited.

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[4] D. H. Russell, "Reading and Child Development," *Forty-eighth Yearbook of the National Society for the Study of Education*, Part II, *Reading in the Elementary School* (Chicago: Univ. of Chicago Press, 1949), pp. 10-31. Quoted by permission of the Society.

Concepts are not limited to objects in one's environment. They often involve abstractions that are neither in one's immediate environment nor within the range of one's sensory experiences. Consider for example the concept, "Democracy." The elementary-school child has perhaps heard the word frequently used with reference to the government of the United States. The concept "Democracy" as an intangible quality characteristic of many institutions does not appear during the early life of the child, and is very restricted for many adults. Concepts grow out of a wide range of meaningful experiences with a particular word which denotes some quality or characteristic to be found in many situations.

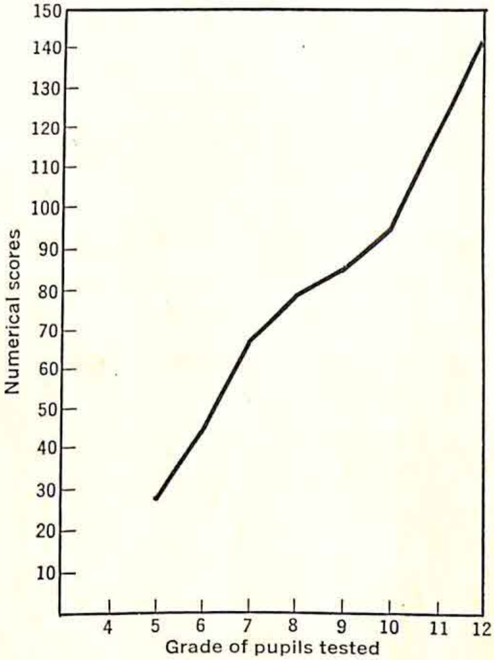

FIGURE 14-2. The growth of concepts from grade five through grade twelve

Differentiation and integration. The basic process of acquiring concepts is one of differentiation and integration. Consider, for example, the acquisition on the part of the child of the meaning and concept of the word *aunt.* At first this may relate to a single person with whom the child has had a number of associations. This person is in some ways different from all other persons. At this stage meaning is established. With further experiences he learns that he has more than one aunt, and even has different kinds of aunts, such as a great aunt. He also learns that other children have aunts. The concept of aunt is identified with the family. At this stage we note the process of integration. Precision and generalization appear with additional growth and learning.

Since the acquisition of a concept requires time and many experiences, the continuum of meaning is constantly widening. At the beginning, a given concept may be at the starting point on a continuum of development, which is little more than a specific meaning attached to a word. This is shown in the results of a study by Meltzer.[5] By means of the personal interview he gathered data on 383 children from grades four through twelve. The average scores obtained by the children at the different grade levels are shown in Figure 14-2. The irregularities which appear in individual curves are smoothed out when averages were obtained for the different grades. Growth patterns for the different concepts studied varied considerably. The children's grasp of concepts was found to correlate highest with educational age (.80 ± .03). Significant correlations found with other factors are:

Concepts score with grade	.69 ± .03
Concepts score with mental age	.58 ± .04
Concepts score with chronological age	.55 ± .04
Concepts score with occupational status	.36 ± .04

Factors influencing the learning of concepts. The literature on the learning of concepts has furnished useful information about the factors which influence concept formation. The most important factor in the learning of concepts is personal experience. However, it should not be inferred here that teaching and guidance are unimportant. Concepts have their beginning in experiences which furnish general impressions. During the early years many concepts exist before the individual child is able to express them. They often begin with part meanings or even erroneous meanings. It is through additional experiences that these part meanings are expanded and erroneous meanings are eliminated.

Studies of concept formation by Smoke showed wide individual differences in the ability and manner of learning concepts.[6] The level of the child's intelligence is an important factor in the ability to formulate new concepts correctly. The ability of children to define concepts and understand them tends to develop as they pass through the grades. According to the study by Smoke some subjects appear to learn little or nothing from negative instances, while others found negative instances instructive. In either case the process seems to involve grouping. The learner needs to recognize certain stimulus patterns as constituting a group of related elements.

The influence of set on the learning and retention of concepts was

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[5] H. Meltzer, *Children's Social Concepts: A Study of Their Nature and Development* (Teachers College, Columbia University, Contributions to Education, 1925), No. 192.

[6] Kenneth L. Smoke, "An Objective Study of Concept Formation," *Psychological Monographs*, Vol. 42 (1932), pp. 1-43.

Close association between classroom activities and everyday experiences gives increased meaning and purpose to materials encountered at school

investigated by Reed with fifty-one college students as subjects.[7] The materials used consisted of 42 cards, each of which had four unrelated English words on the face and a nonsense syllable on the reverse side. The college students were divided into two groups. One group was instructed to learn only the names of cards, which were the nonsense syllables on one side of each card. The other group was instructed to learn both names and the meanings (English words) associated with them. The results from this study revealed that a set to learn meanings as well as names yields a much higher rate of learning and degree of retention than does a set to learn names only. Also concepts logically formed are learned more quickly and better remembered than those illogically formed. The importance of set or goals is emphasized in the results of this study. The individual set to learn a problem in arithmetic is more likely to see relationships and form logical deductions than one merely set to memorize a formula. This problem is furthermore closely related to meaning. The concept of justice is learned more readily when it is closely related to activities and experiences in the home and at school. The learning of a concept is enhanced by an educational procedure which makes it meaningful and significant to the individual learner.

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[7] Homer B. Reed, "Factors Influencing the Learning and Retention of Concepts. The Influence of Set," *Journal of Experimental Psychology*, Vol. 36 (1946), pp. 71-87.

There is no uniform method for learning concepts. Neither is there any one best method. Each individual tends to arrive at his goal by his own method. However, Reed points out from his observations of concept formation that there are some steps which frequently occur.[8] These are designated as follows:

First, a period of doubt and orientation

Second, a period of search and trial solutions

Third, a period of evaluation and checking.

The retention of concepts will depend upon such factors as thoroughness of learning, meanings, and intent to remember. The early studies by Ebbinghaus, referred to in Chapter 11, revealed that meaningless materials are poorly retained. The retention of meaningful concepts and nonsense materials at different intervals following the initial learning is presented in Table 14-1. Even though the materials in the experiments by Ebbinghaus were learned to the second errorless reproduction, while those of Reed's study were only learned to the point of first errorless reproduction, there is an enormous difference in the percentage of concepts retained. It is also of interest that Reed found that consistent concepts are retained better than inconsistent ones.

TABLE 14-1. *Percentage of retention for consistent and inconsistent concepts and nonsense materials* *

GROUP	KIND OF CONCEPT	MEAN PERCENTAGE OF RETENTION AFTER		
		ONE WEEK	THREE WEEKS	SIX WEEKS
4	Consistent	97.6	95.6	96.0
	Inconsistent	95.4	91.2	89.2
5	Consistent	97.3	95.0	
	Inconsistent	94.2	89.5	
6	Nonsense syllables			
	Ebbinghaus	25.4	22.8**	18.2**
	Radossawlejevitch	49.3	38.0	16.3**

* After Reed

** Interpolated from the curve

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[8] *Ibid.*, p. 84.

Acquiring number concepts. An important aspect of the arithmetic program is that of readiness for number work. It was pointed out in Chapter 6 that children vary widely in their growth of concepts. Studies by Brownell and others show that many children are unready for special assignments when they are called upon to start certain kinds of learnings. Brownell suggests that instruction should be individualized to a greater extent in order to insure increased readiness.[9] Investigations by Mott traced the growth of number concepts among preschool children.[10] In a study in which the interview technique was applied to forty-four children between thirty-four and seventy-three months of age, it was found that 92 per cent had developed concepts for the numbers from one to ten. The concepts developed by children who had attended a nursery school and kindergarten were superior to those of children who had not had such school experiences. These numerical concepts apparently originate in concrete pattern situations. Thus early personal experiences with counting, simple addition, and simple subtraction should originate in concrete experiences with things and people. As a result of experiencing such patterns, the child acquires a rich background of understandings, which furnish a basis for the growth of numerical concepts.

Readiness for number learning depends upon the experiences of the child as well as his degree of maturation. The number concepts which the child has when he enters school should be the beginning point for the formation of new and enlarged number concepts. Meaningful experiences with numbers, although primarily mathematical experiences, do not take place in a vacuum. Addition and subtraction mean much more to the child when they are used in actual situations involving people, books, pencils, chairs, and the like, than when they are encountered as abstractions to be learned in a memory fashion. As the child grows in understanding the meaning of different number combinations, he develops a state of readiness for more complex numerical processes. However, before he is given problems involving simple fractions he should have had sufficient experiences with such fractions to enable him to understand the meanings of the terms used. Experiences with halves and thirds, acquired by means of objects and other concrete experiences, will lead him to see their relationship relative to one another.

Learning science concepts. Learning content in science should be thought of as a means, not an end. It is a means to help the child understand his environment better and grow in the ability to cope with it. A scientific concept is not something which a teacher can have the child master in a unit of work. In a sense it is never mastered. However, it should be integrated into the whole of the child's experiences. Each experience becomes a part of a larger whole or configuration. Such a notion of the acquisition of concepts means that time is essential for a concept to be learned and integrated into a child's patterns of experiences. Growth in understanding grows out of this gradual accumulation and integration of varied science experiences.

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[9] William A. Brownell, "Arithmetical Readiness as a Practical Classroom Concept," *Elementary School Journal,* Vol. 52 (1951), pp. 15-22.

[10] Sina M. Mott, "Number Concepts of Small Children," *Mathematics Teacher,* Vol. 38 (1945), pp. 291-301.

A pupil's ability to understand a science concept depends largely upon the concrete experiences he has had related to the concept. It is easy for the child reared in an environment where fruit is grown to understand the role of bees in the pollination process. If sensory experiences precede efforts to guide the child in abstract thinking about a science concept, he will then be ready for such thinking. This is essential if the student is to be able to project his own experiences into a rational solution of a scientific problem.

Acquiring social-science concepts. The implications of the learning of concepts of social issues are that such concepts should be as realistic as possible and closely related to the everyday life of the pupils. The desirable and undesirable features of such terms as justice, equality of opportunity, monopoly, democracy, and dictatorship can best be understood when they are related to happenings in the classroom, on the playground, or in out-of-school activities. Books, pamphlets, audio-visual aids, and special materials developed as individual or group projects stimulate curiosity and encourage learning in the social studies. Social-science concepts can best be learned through a wide variety of experiences which are realistic to the learner. Historical learning involves the acquisition of time concepts and generalizations of cause-and-effect relationships. Readiness for such learnings depends upon a fair degree of mental maturity and a variety of experiences related to the learning situation.

One of the major difficulties of learning in the sciences and social sciences arises from the abstract nature of the material presented. Visits to places in the community is a good method of giving pupils concrete experiences.[11] These are most important in cases where concrete experiences of the pupils have been quite limited.

Acquiring moral concepts. An important area of learning so often misunderstood or poorly applied is that of developing moral concepts. Much of the emphasis in earlier schools was on learning *about* rules, regulations, codes of conduct, and desirable patterns of behavior. It was more or less assumed that if a person learned the things that were good to do, he would practice them. More recent studies of the nature of learning have revealed that we learn by doing, rather than from studying how to do. This does not mean that the *how* is of no value, but rather when this is not accompanied by motives and goals it is largely fruitless. This is well illustrated in learning to swim. The child who is not motivated to learn to swim and fails to apply the methods taught him acquires little of value from the study of principles and theory of swimming.

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[11] See Dwight K. Curtis, "The Contribution of the Excursion to Understanding," *Journal of Educational Research*, Vol. 38 (1944-45), pp. 201-212.

Again, the learning of moral concepts is often confused because of the manner in which they are presented. At Sunday School the child may be taught the general principle, "Thou shall not steal." This principle is often presented with few or no specific applications to different situations that are meaningful and significant to him. Thus, such a learning will have little significance to the child, since he must comprehend the meaning of specific facts and their applications before he is able to grasp and apply broad generalities.

Sometimes the child's behavior fails to measure up to what one expects of him on the basis of the moral principles involved. This results primarily from lack of motivation and clearly defined sense of values. In his relations with his peers he may find that his code of conduct is regarded as queer, since he is motivated to follow moral principles taught at home. Or, the child may find that the children who do certain forbidden things have more fun, thus he is motivated to do those things in order to be accepted by them and share with them certain pleasures. Moral concepts are best understood when they are integrated into the total behavior patterns. They become well-nigh meaningless and insignificant when they are taught as certain rules to be memorized.

THE ACQUISITION OF GENERALIZATIONS

Although generalizations, concepts, and meanings are treated in this chapter as separate learnings, it should be pointed out that there is no clear line of demarcation between these. Concepts may be said to emerge as a result of generalizations. Also, generalizations make use of meanings and concepts already established. The fundamental principles of learning presented in Chapter 11 are involved in the acquisition of meanings, concepts, and generalizations.

The process of generalization. The importance of experience as a background for the growth of meanings and concepts was emphasized earlier in this chapter. However, the value derived from the mere accumulation of meanings and concepts is of limited, if not of doubtful value. It is through organizing and applying our experiences to other situations which we meet that they become significant. This ability to remember the qualities and characteristics of things encountered and to relate them to new things encountered has been termed *generalization*. Generalization, as generally used in educational psychology, refers to a verbalized formulation of a relationship which may be applicable to many conditions or situations. It is an application of some rule, principle, or idea from a single or few cases to a large number of cases.

A generalization may involve a number of concepts. Thus, it is essential for the learner to have a clear understanding of the concepts present in a particular generalization. Consider, for example, the generalization: "Universal education is essential for citizenship in a democracy." The learner must understand what is meant by "universal education," What is "citizenship"? What is a "democracy"? Are there degrees of citizenship? Are there different kinds of democracies? Is our country a democracy? The learner who is unable to answer such questions will be unable to understand and apply the generalization of universal education in a democracy.

The question has been raised: At what age should the child be able to generalize? A number of investigations have presented data on this problem. In one study children from kindergarten through the eighth grade were tested for their ability to generalize and apply the results of experience.[12] The data gathered from different tests of generalization indicated that a small percentage of kindergarten and primary-grade children are capable of generalizing and applying such principles as the simple pendulum, or comparisons of plants and animals. A continuous growth in generalization ability from the kindergarten through the eighth grade was noted. The lack of further development noted after the eighth grade may have resulted from the nature of the tests used or the type of instructional program at school. A sound educational program will provide desirable opportunities and guidance for a continuous growth and enlargement of the ability to generalize.

Generalization an active process. An important principle of guidance in generalizing is to induce pupils to give careful attention to the meaning and use of the rule or principle.[13] It is very important for pupils to explore the nature and use of rules; however there is not likely to be much exploration when the materials are not well understood. Thus, a thorough understanding of a principle is important for making generalizations based on the particular principle. However, this in itself will not serve as a guarantee that generalizations will be made. The teacher may guide the student by making suggestions or pointing out possible leads or cues. It is necessary, however, for the learner to follow a self-active approach, rather than have the teacher make all the generalizations.

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[12] W. C. Croxton, "Pupil's Ability to Generalize," *School Science and Mathematics*, Vol. 36 (1936), pp. 627-634.

[13] H. B. Reed, *op. cit.*

Initial verbal information on the principles involved in a generalization may shorten the process by which the learner arrives at the generalization. This was borne out in a study by Hendrickson and Schroeder dealing with the application of the principle of the refraction of light by water.[14] Two groups of subjects were used in learning to hit a submerged object. The one group was given instruction on principles of light refraction by water, while the other group was given no such instruction. The mean gain of the control and experimental groups is shown in Table 14-2. An examination of the results shows that Group B, which was given the most complete explanation, registered the greatest gain. These results indicate that generalizations from verbal instruction are valuable in the development of sensory-motor skills. The extent of such generalizations will be closely related to the experiences and intelligence of the learner.

TABLE 14-2. *The improvement of the control and experimental groups from the first problem to the second problem*

	MEAN OF TRIALS REQUIRED		
GROUPS	AT 6 INCHES	AT 2 INCHES	PERCENTAGE OF IMPROVEMENT
Control	9.10	6.03	34.1
Experimental Group A	8.50	5.37	36.5
Experimental Group B	7.73	4.63	40.3

The learning of generalizations. Although not all problem-solving leads to generalization, all generalizations are the results of problem-solving. Generalizations are different from simple meanings, which are learned through association. They are furthermore not learned through the memorization of a definition of a word, although the meaning of the word may well be arrived at through a variety of situations in which the word is the essential element. Since the development of problem-solving ability is treated in Chapter 15, the discussion here will be limited to some of the major difficulties encountered in making generalizations.

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[14] Gordon Hendrickson and William H. Schroeder, "Transfer of Training in Learning to Hit a Submerged Target," *Journal of Educational Psychology,* Vol. 32 (1941), pp. 205-213.

The importance of meaningful instruction was revealed by Anderson in a comparison of the outcomes of meaningful instruction in the learning of arithmetic with those obtained from a more mechanical process which emphasized the acquisition of specific steps and procedures.[15] The findings of this study indicated that there was little difference between the two methods when measured by outcomes in computation exercises. However, a significant difference appeared in favor of learning the materials in a meaningful manner (understanding the nature of the exercise) and being able to apply the principle learned to problems different in certain details from those encountered in the instruction.

One difficulty in learning geometry is a lack of understanding of the concepts presented. After all, angles and lines are difficult to visualize, other than as geometric abstractions. The student often remembers them only as figures on a certain page and position in the text. This may be noted in the case of right-angle triangles of Figure 14-3. Some students are actually confused when the right-angle triangle appears in Form II, when it has always been experienced in Form I. Appropriate generalizations about the nature and principles involving a right-angle triangle necessitate a variety of experiences with such a triangle. Another difficulty arises from the abstract nature of the manner in which a right-angle triangle is presented. The learner is too often motivated and guided in learning the proposition as presented in the book without any consideration of its relationship to some realistic problems. His problem is "to learn the assignment," and thus obtain a satisfactory grade.

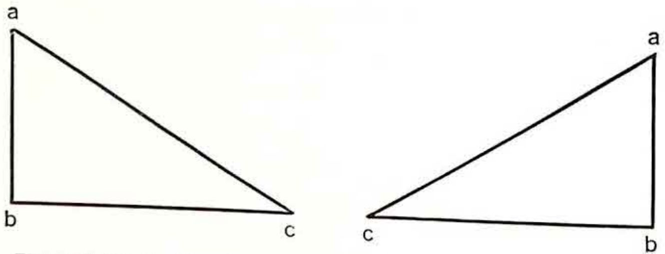

FIGURE 14-3. Showing two drawings of a right triangle

A study by Tiedman of the retention of sixth-grade pupils showed that they have considerable difficulty in applying and interpreting nonpictorial map symbols found in their geography textbooks.[16] This finding has important educational implications. Where charts and map symbols are used in the lower grades these should be of a pictorial nature. The nonpictorial materials being of a more abstract nature should be used with caution in the early school years.

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[15] G. L. Anderson, "A Comparison of the Outcomes of Instruction Under Two Theories of Learning," Ph.D. Thesis (University of Minnesota, 1941).

IMPLICATIONS FOR TEACHING

The learning situation at school. The fundamentals of teaching have been gradually changing during the course of the past several decades. These changes have resulted primarily from the following factors: (1) a better understanding of the nature of child growth and development; (2) the accumulation of research in the various areas of learning; and (3) changed concepts of the aims of education. The shift in methods of teaching from one major viewpoint of instruction to another has presented many problems as well as considerable controversy. The traditional school was designed primarily to teach the 3R's and a body of subject matter. Subject-matter material was covered in a piecemeal fashion, according to short day-by-day assignments, without any unifying principle and with little consideration of activities beyond the lesson being covered.

The broadened objectives and changed notions about learning have made the school program more lifelike. The modern school recognizes individual differences and tries to make provisions for them. Subject matter is taught for its functional value and is closely correlated with activities within the school and beyond the classroom. Subject matter and tools become means for the development of well-rounded personalities rather than ends in themselves.

The role of good teaching. The school situation brings together boys and girls of the same age level and provides them with opportunities to grow and develop in harmony with certain ideals set forth in the philosophy of the school and the community. Methods for promoting development and learning may be classified as: (1) incidental, (2) formal, and (3) planned functional. The first of these involves no planned activities, but the fact that a favorable environment is provided for the stimulation and enhancement of the individual's growth, insures certain types of learning and development. The notion that the school should concern itself with verbal learning alone has in general been replaced with a much broader concept of education, especially in the modern elementary- and secondary-school program. The planning of activities in the classroom, on the playgrounds, and in other phases of the school program that will contribute to the healthy growth and development of pupils is extremely important, but oftentimes difficult to achieve. The schools are turning their attention toward educative experiences in all phases of the school program and to certain types of out-of-school activities. The activities of the school can best function in promoting development and learning when its entire program is integrated in a functional manner with other aspects of the lives and activities of growing boys and girls.

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[16] Herman R. Tiedman, "A Study in Retention in Classroom Learning," *Journal of Educational Research*, Vol. 41, (1947-48), pp. 516-531.

It is the task of the teacher to plan, with the pupils, activities that will lead to desirable development and learning. The teacher is, furthermore, faced with the task of setting forth conditions which will stimulate favorable growth. At all times the teacher should bear in mind that it is the pupils and their development with which she is most concerned; that the curriculum is secondary in nature—being materials useful to the teacher in guiding the learning of the pupils; that visual aids and other helpful teaching devices are merely tools that may be used successfully or unsuccessfully in the promotion of learning; that exhibits, club activities, and other adjuncts are designed to promote favorable development and learning; and that none of these will be any more useful than the ingenuity and understanding of the teachers and pupils in using them.

Modern vs. conventional practices. Much controversy has centered around the effectiveness of modern school practices. The most common criticism of the modern school is that it fails to teach students the fundamental skills. Many studies have been conducted in which the effectiveness of modern and traditional methods have been compared. A survey of studies completed prior to 1942 by J. Wayne Wrightstone furnishes some valuable information on this problem.[17] Six of seven major studies surveyed showed that students taught by modern methods did somewhat better in reading achievement, while one study indicated that these students fell slightly below the national average. Students in the modern secondary schools were as good or better in reading achievement than those from the traditional schools. Somewhat similar results were reported from a survey of comparative achievement in arithmetic skills. In language usage all studies at both the elementary and secondary level showed a superiority of achievement for students where modern methods were used. Little difference was noted in the case of spelling where two studies reported a superiority for modern methods, one for traditional methods, and one showed equivalent achievement.

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[17] J. Wayne Wrightstone, "Growth in Basic Skills," in J. P. Leonard and A. C. Eurich, *An Evaluation of Modern Education* (New York: Appleton-Century-Crofts, Inc., 1942), pp. 151-181.

On the basis of these studies, supplemented by results from more recent studies, there seems little evidence for the assertion that modern methods neglect basic skills. On the contrary, these skills appear to be learned as well if not better where modern methods are used than where traditional methods are used.

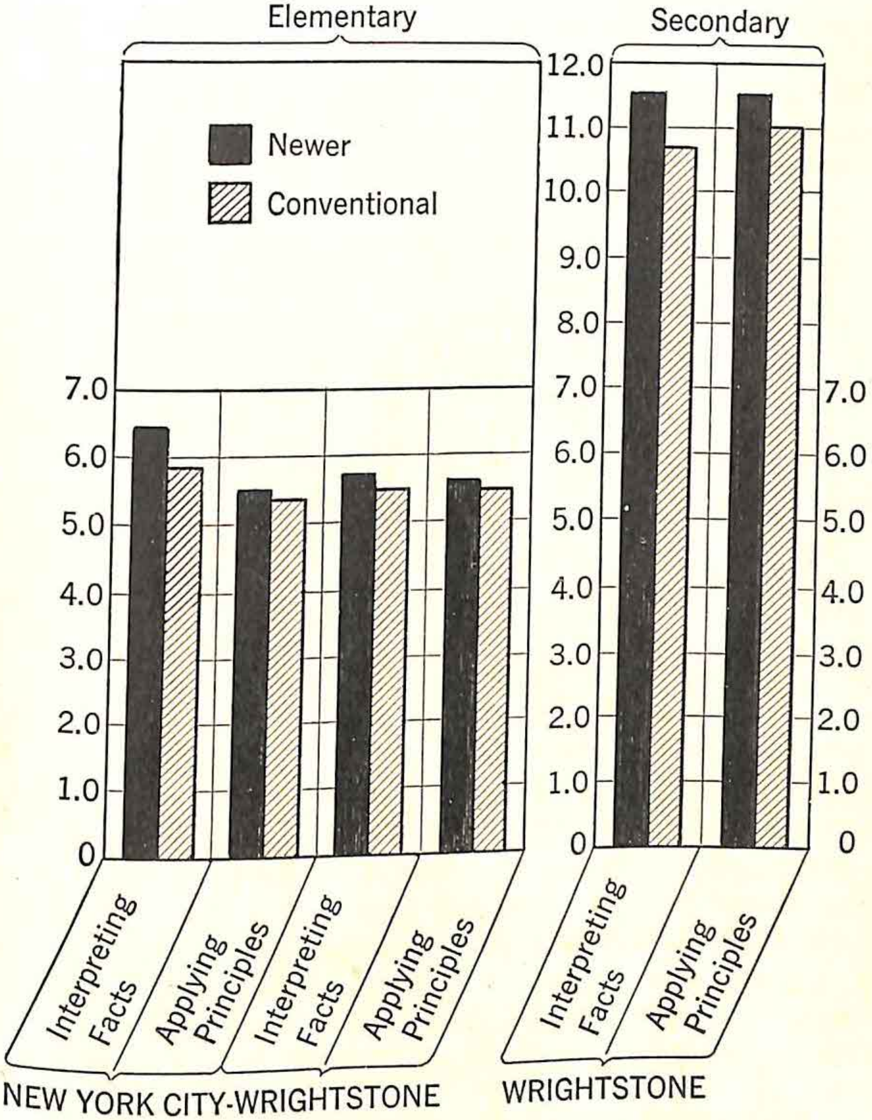

FIGURE 14-4. Comparative achievement of newer and conventional school pupils in skills of critical thinking as reported by various studies

Although the available data for analyzing work-study and library skills is more limited than those for reading, arithmetic, and language skills, the evidence clearly favors the modern school program. Pupils from modern schools display more ability in reading maps, charts, and graphs, in knowing reliable sources of information, and in using the library as a source of information. The conclusions on critical thinking coincided with those for work-study skills and library skills. The results presented in Figure 14-4 indicate quite clearly that the modern school program in both elementary and secondary school is superior to the conventional program in training pupils in the critical-thinking skills.

Learning proceeds in wholes. A psychological principle which has been stressed in recent years by the Gestalt psychologists is that learning proceeds as a whole rather than through the addition of discrete parts. Closely allied to this is the notion that the learning of new materials involves a continuous reorganization of previously learned materials, and should not be regarded as an additive process. This may be observed in a study of navigation on the Mississippi River. The pupil not only learns some new facts about navigation on this river, but increases his knowledge of previously learned materials on the Mississippi River and its tributaries.

A considerable amount of literature on the whole versus the part method of learning is available in research studies on this problem. However, the conclusions from those most carefully conducted are not conclusive. The results of a study reported by Jensen and Lemaire in which a total of 638 children were used as subjects in ten investigations are useful in this connection.[18] In the memorization of poetry the whole method was found superior so far as the group average is concerned. A study of individual learning curves reveals, however, that one should not apply such results to individual cases. Of the 504 children for whom there was adequate data it was found that 17.2 per cent learned significantly better by the whole method; while a similar number learned better by the part method. Neither the children with a high IQ nor those with a low IQ learned significantly better as a group by one method than by the other.

The part method has the advantage of dividing the materials into units within the mental grasp of the learner so that he can better focus his attention on difficult parts of the task. On the other hand, the whole method enables the learner to connect all the parts into a single pattern and thus eliminate the necessity of connecting previously learned parts. A combination of the whole and part procedures has been found effective in learning difficult materials, such as is found in most science courses. In most school tasks it seems desirable to first comprehend the materials in large units, next give special attention to the different parts, and finally study and review the materials as a complete unit. The various studies dealing with this problem do not justify the use of one method to the total exclusion of the other. The suggestion set forth by Woodworth that the whole method be followed but that special attention and practice should be given to difficult or important parts appears to be a sound one to follow.[19]

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[18] M. B. Jensen and Agnes Lemaire, "Ten Experiments on Whole and Part Learning," *Journal of Educational Psychology*, Vol. 28 (1937), pp. 37-54.

Use of audio-visual aids. Many teachers have made use of certain types of visual aids throughout the centuries. Maps, globes, pictures, and models have been found helpful in fostering learning. There is considerable experimental evidence indicating that visual aids are valuable in teaching. One of the early experiments on this was conducted by Wood and Freeman.[20] About 7500 children in geography and 3500 in general science were used in these studies. The results as shown by various tests were definitely in favor of the experimental groups, with whom motion pictures were used as teaching aids.

A study reported by Jayne compared the effectiveness of the lecture method and the silent motion picture for presenting materials in general science to tenth-grade pupils.[21] The results of this study indicate that the increased gain, reported in a number of studies, which accrues from the use of visual-aids materials is not due to the use of such materials alone, but rather to the adding of the visual experiences to other teaching procedures. Visual presentation when integrated with lecture, study, and recitation should lead to increased learning and retention. It should not be used as a substitute for good teaching.

The development of the radio and television has widened the scope of studies conducted earlier involving the value of motion pictures and visual aids. Kraviec compared the visual and auditory modes of presentation for the complete learning and for the retention of verbal materials.[22] The materials learned consisted of (1) four lists of 12 nonsense syllables; and (2) four lists of 20 three-letter monosyllabic nouns. A comparison was made of the use of the visual and auditory modes of presentation for the learning and retention of these materials. The visual mode of presentation was found to be superior for both nonsense syllables and nouns. No significant superiority was noted for either mode of presentation in the case of retention.

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[19] R. S. Woodworth, *Experimental Psychology* (New York: Henry Holt and Co., 1938).

[20] Ben D. Wood and F. N. Freeman, *Motion Pictures in the Classroom* (Boston: Houghton Mifflin Co., 1929).

[21] Clarence D. Jayne, "A Study of the Learning and Retention of Materials Presented by Lecture and by Silent Film," *Journal of Educational Research,* Vol. 38 (1944-45), pp. 47-58.

[22] T. S. Kraviec, "A Comparison of Learning and Retention of Materials Presented Verbally and Auditorially," *Journal of General Psychology,* Vol. 34 (1946), pp. 179-195.

TABLE 14-3. *A comparison of the amount of information acquired and retained seven weeks by three experimental groups*

METHOD	PRE-TEST MEN	POST-TEST MEN	RETENTION-TEST MEN
Reading	4.28	17.17	10.50
Listening	3.73	13.67	8.98
Reading plus	3.20	19.17	10.79

The particular sensory avenue used in learning is not in itself the important factor. That avenue is superior which will enable the learner to best differentiate the materials and integrate them into meaningful patterns. No doubt certain types of materials will be grasped more readily through one mode of presentation while other materials will be grasped more quickly through other modes. It is likely that more than one avenue of presentation is advantageous in the learning of much of the materials encountered at school.

Students from the eleventh grade were used as subjects in a comparison of the relative effectiveness of reading and listening to radio programs as means of gathering information.[23] The experiment was designed to furnish direct comparisons between the scores of each student before and after exposure to the three experimental methods: reading a radio script, listening to a radio dramatization, and reading a radio script in addition to extra materials. The results, presented in Table 14-3, showed that all three methods were valuable in imparting information. The reading method was found to be slightly superior to the listening method in acquiring information; however, after a lapse of seven weeks there was no significant difference in the amount retained. The advantage of being able to cover more in the same amount of time favors the reading method. However, the listening method would appear to be more effective for students of low reading ability; although these students may need more time to complete their reading and perhaps read some extra material.

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[23] Oscar M. Haugh, "The Relative Effectiveness of Reading and Listening to Radio Drama as Ways of Imparting Information and Shifting Attitudes," *Journal of Educational Research*, Vol. 45 (1952), pp. 489-498.

STUDIES OF RETENTION IN SCHOOL SITUATIONS

It was pointed out in Chapter 11 that the retention of materials learned is dependent upon a number of factors. Among the most important ones are:

1. the nature of the materials learned.
2. thoroughness of learning.
3. the extent to which the materials are organized into a meaningful pattern.
4. the distribution of the practice periods.
5. the nature of the activity of the learner during the period of no practice.
6. the kinds of learning—for example, factual information, understandings, interpretations, generalizations.

Loss over the summer vacation. Many of the studies of retention in school subjects have shown certain losses during the summer vacation. In the elementary school, the teachers often devote the first weeks of each school year to reviews of the previous year's work in an effort to overcome any loss that might have taken place during the summer vacation.

The results of studies of the loss of knowledge and skills over the summer vacation are not wholly in agreement. Laslett and Schrepel used the results of the *New Stanford Achievement Test* in studying the loss of knowledge of eighth- and ninth-grade students during a summer vacation of fourteen weeks.[24] They found that in fourteen of the twenty-two subjects the pupils actually showed a gain. The loss found for both groups was in arithmetic computation. There were pronounced gains found in word meaning, literature, and the social science subjects. These results do not warrant the practice of strenuous reviews when pupils return to school in the fall. They raise again the question of the relative value of speed of education versus maturation in the organization of the educational program. They also point to the value of experiences outside the school in providing for the educational growth of students.

The curve of forgetting. It has already been suggested that the nature of the curve of forgetting will be conditioned by a number of factors. Sister Lahey noted from a study of 229 students who had studied algebra and were at the time of the study enrolled in geometry that retention of ability in problem-solving was more closely related to intelligence than is retention of computational power.[25] However, the fact that the correlation coefficients tended to decrease as the length of the interval was increased furnished some evidence that retention was more closely related to thoroughness of learning than to intelligence.

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[24] H. R. Laslett and M. Schrepel, "On the Loss of Knowledge by Junior High-School Pupils over the Summer Vacation," *Journal of Educational Psychology,* Vol. 27 (1936), pp. 299-303.

Studies show that, in general, forgetting is most rapid during the weeks immediately following the initial learning. One study reported that a class in 7B history had forgotten approximately one-eighth of the material at the end of four months.[26] The curve of forgetting during the sixteen months following the initial learning is shown in Figure 14-5. The curve of forgetting of a college botany class was more pronounced.[27] By the end of a three-month period, the average loss was 43.4 per cent. Following this there was a steady loss of knowledge so that by the twentieth month the average amount retained was less than 25 per cent. Those students who made the highest scores at the end of the course retained relatively more of their knowledge after a period of three or six months.

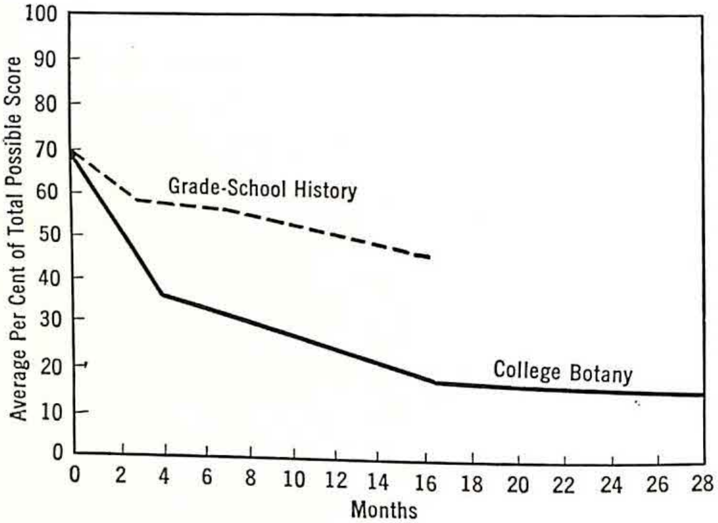

FIGURE 14-5. Retention curves of junior high-school history and college botany

The differences in retention for history and botany, shown in Figure 14-5, may be attributed to many factors, and do not necessarily reflect differences in retention for the type of subject matter studied. The amount of intensive drill, thoroughness of learning, or difficulty of the tests used may have accounted for these differences. The findings from the different studies dealing with the effects of reviews on the retention of learning point to the following conclusions:

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[25] Sister M. Lahey, "Permanence of Retention of First-year Algebra," *Journal of Educational Psychology*, Vol. 32 (1941), pp. 401-413.

[26] F. D. Brooks and S. J. Bassett, "The Retention of American History in the Junior High School," *Journal of Educational Research*, Vol. 18 (1928), pp. 195-202.

[27] P. O. Johnson, "The Permanence of Learning in Elementary Botany," *Journal of Educational Psychology*, Vol. 21 (1930), pp. 37-47.

1. Review tests are effective in aiding retention of materials learned in the classroom and should be employed as a principle of learning.
2. To secure the best results the review tests should be given immediately after the learning and at increasingly longer intervals thereafter.
3. Review tests may aid the retention of erroneous as well as correct conceptions; therefore provisons should be made for correcting wrong impressions.

Guidance and retention. Analysis of the recall of information discloses that the details which are remembered best are those which are most clearly understood. There is also much evidence that understanding is retained much better than specific information. The results of one study, shown in Figure 14-6, revealed that the retention of verbatim materials decreased rapidly during a four-week period following the learning, while the recognition of the substance of the materials showed no decrease.[28] Even after a period of thirty days the subjects were able to recognize correctly the

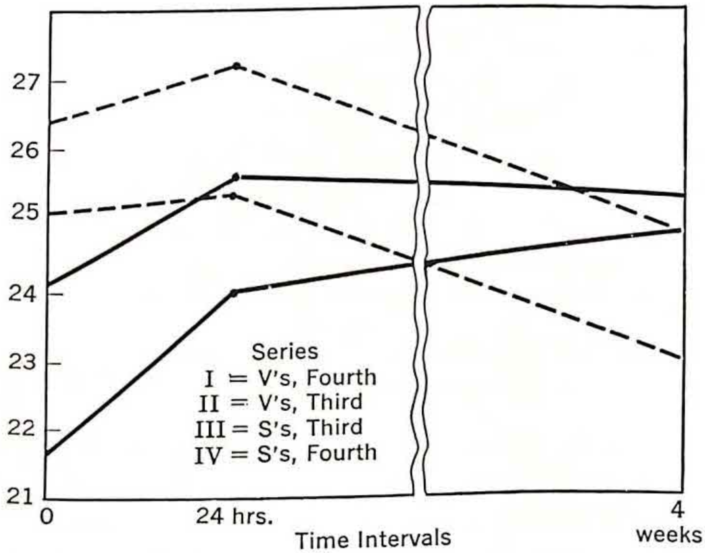

FIGURE 14-6. Retention curves for verbatim and substance materials

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[28] H. B. English, E. L. Wellborn, and C. D. Killian, "Studies in Substance Memorization," *Journal of General Psychology*, Vol. 11 (1934), pp. 233-260.

general idea of the passage. These outcomes are significant to education, since they signify that general ideas and principles learned at school are retained, although much of the factual material is soon forgotten. The results of such studies have led in some cases to erroneous ideas about the acquisition of facts. It should be pointed out that *broad understandings grow out of a variety of meaningful information*. There is no "royal road to learning," whereby the learner can grasp and retain general ideas and principles in the absence of specific information.

A study by Lazarsfeld and associates showed the effects of the past experiences of individuals upon the retention of materials.[29] The study dealt with the reactions of individuals of various nationality and racial backgrounds to the same motion picture. The film was a British war picture, *Naples Is a Battleground,* shown in the early summer of 1944. This was shown to groups consisting of native white Americans, American Negroes, and Italians. The white Americans observed the American power and remembered particularly the showing of General Mark Clark; the Negroes gave most attention to the Negro troops shown in the picture; and the Italians were impressed and horrified by the ruins and devastation resulting from the war. These results show the importance of attitudes and values on the things observed in a situation and the things remembered.

The implications of this study for the teacher are clear. The materials observed and remembered by students in the laboratory or on a field trip will be significantly influenced by their cultural background. The farm boy and girl may be most impressed by the "Badlands" of South Dakota as a land of waste; while the urban boy and girl will remember certain features of the boulders and countryside in contrast to things experienced in their urban environment.

SUMMARY AND IMPLICATIONS

The importance of experience in the development of meanings has been emphasized throughout this chapter. A progressive educational program will take into consideration experiences outside the school as well as those at school in the development and enlargement of meanings. Cues and symbols play an important role in the behavior of children as they grow in knowledge and understanding. Through the development of language symbols the child acquires a readiness for learning to read. Most children can learn to read after the age of six, although there is the question of the advisability of beginning formal reading activities at this age level. Tests have been developed for evaluating reading readiness. These should be useful in planning the first-grade reading program.

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[29] See Muzafer Sherif and Hadley Cantril, "The Psychology of Attitudes," *The Psychological Review,* Vol. 53 (1946), pp. 1-24.

The importance of *differentiation* and *integration* in the acquisition of a concept should be recognized by the teacher. Precision and generalization appear with additional growth and learning. The growth of concepts is closely related to educational growth, mental growth, chronological age, and occupational status of the individual's parents. The retention of a concept will depend upon such factors as thoroughness of learning, meanings, and intent to remember, it has been noted that the learning and retention of concepts at school are made easier when the materials are meaningful and realistic. The problems of learning in the content subjects present certain important common features. Some of these are:

1. the importance of the learner's experiences.
2. the need for motivation for efficiency in learning.
3. the role of differentiation and integration in learning new materials.
4. the importance of practice and reviews for the development of precision and accuracy.
5. the importance of *units* in learning; that is, the use of the whole or patterns in learning.
6. the role of guidance in the learning process.

Teaching the child to generalize is made difficult when he lacks the experiences essential for such generalizations; however, experience alone is insufficient. Generalization has been described as an active process whereby the learner carries over an idea or principle present in one situation and applies it to a somewhat similar situation. It is essential for the learner to follow a self-active procedure, if generalizations are to be made. Generalizations are made difficult by a lack of a thorough understanding of the materials present.

Important changes have taken place within the past several decades in teaching procedures. Teaching has recently been described as *guidance*. The modern teacher is concerned with the guidance of learners in the acquisition and application of concepts and in making generalizations. The importance of learning by wholes, well-organized reviews, and meaningful learning materials have been emphasized. There is "no royal road to learning and retention"; however, good teaching will contribute to increased efficiency in learning and increased retention.

Questions and Exercises

1. Discuss the importance of cues in everyday life.
2. What are some of the factors involved in reading readiness? Discuss the importance of a knowledge of reading readiness for the teacher.
3. In what ways is a concept more than a word and more than mere meaning? Illustrate.
4. Show how *differentiation* and *integration* are involved in the acquisition of a concept.
5. What are the general conclusions and implications of the findings from the study by Meltzer about the growth of concepts throughout the grades?
6. Give examples to show that readiness applies to all areas of learning, including the development of attitudes and appreciations.
7. What are some essentials in the learning of number concepts? What are some of the major difficulties involved?
8. How would you account for the loss in arithmetic computation and actual gain in social studies and reading comprehension during the summer vacation?
9. What are some of the major difficulties encountered in the teaching of moral concepts? What are some sources of confusion to the learner?
10. Show how the abilty to generalize depends upon experience. Upon maturation.
11. Give several common generalizations made about education.
12. Discuss the proposition that "generalization is an active process."

Recommended Readings

Anderson, H. R. ed., "Teaching Critical Thinking in the Social Studies," *Thirteenth Yearbook of the National Council for the Social Studies,* 1942.

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Gates, A. I., *Improvement in Reading* (New York: Macmillan Co., 1949).

———, *et al., Educational Psychology,* 3rd ed. (New York: Macmillan Co., 1948), Chap. XIII.

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Learning and Instruction, Part III, *Forty-Ninth Yearbook of the National Society for the Study of Education* (Chicago: University of Chicago Press, 1949).

Progressive Education Association, *Mathematics in General Education* (New York: Appleton-Century-Crofts, Inc., 1940).

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Skinner, Chas. E. (editor), *Educational Psychology,* 3rd ed. (New York: Prentice-Hall, Inc., 1950), Chap. XIV.

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), Chap. XIII.

Trow, William C., *Educational Psychology,* 2nd ed. (Boston: Houghton Mifflin Co., 1950), Chap. XIV, XV, and XVI.

CHAPTER 15

Creative Thinking, Reasoning, and Problem-Solving

FEW CONCEPTS in psychology are more generally misunderstood by the average person than that of *thinking*. Mystery and fantasy still color most explanations of this human attribute. The ancient postulation of a "mind" to perform the function of thinking did not really explain anything but merely pushed the problem back a step. To explain thinking by saying that it is a function of the mind and then not to explain what is meant by mind still leaves thinking unexplained. Many people today accept the postulate *mind* without understanding anything about it except that it somehow performs the function of thinking, which certainly needs explanation. This chapter will attempt to clear up some of the mystery regarding thinking which psychology has inherited from its philosophical ancestry.

DEFINITIONS

So many terms regarding thinking have been used with ambiguous and erroneous meanings that it is necessary first to redefine these terms with greater exactness. Words communicate the ideas of the writer to the reader only if they are understood to have the same meanings by both writer and reader. Misunderstandings, even on an international level, often occur because words do not have the same meanings for both the writer, or speaker, and the reader, or hearer. The following definitions are brief but further meanings will become more clear as the chapter develops.

Problem. A problem is a condition that exists when the method of satisfying a want is unknown. A dog has a problem when he is hungry and does not know where or how to get food. If he always finds food in a certain place when he is hungry (and there are no difficulties in reaching that place), there is then no problem. A pupil has a problem when he takes an examination and does not know the right answers. If he knows the right answers there is then no problem. Discovery or determination of the best way to satisfy wants is problem-solving. If there is no want, there is no problem; if a satisfactory way to satisfy the want is known, there is still no problem.

Motivation. It was pointed out in Chapter 12 that motives relate to the satisfaction of basic needs. All problem-solving behavior is motivated, that is, it is directed toward the goal of want satisfaction. Motivated behavior is "goal directed," purposeful, leading toward an end; as contrasted with aimless, drifting, unplanned behavior. Much of a teacher's school-room endeavor should be to create wants and goals so that her pupils' efforts will be motivated.

Thinking. Thinking is the use of symbols, usually language, generally for the purpose of communication. Language may be verbal as in talking, or written as in writing, or signs and signals as used by deaf mutes, or symbolic patterns of past sensory experiences, as in visual imagery, or some form of artistic expression as in music and art. There are two types or levels of thinking—one in which the symbols are used overtly, as in writing these words, and one in which the behavior is implicit or cannot be observed by others. This is a sort of "whispering to one's self." It is this implicit type of symbolic behavior that the average person misinterprets to be mystical in nature.

The significance of symbolic behavior is not generally recognized. While some of the lower animals are able to respond to unit symbols (a dog can learn that a bell is the symbol for food), only man can combine symbols into sentence form and thus describe the attributes of absent situations. He not only lives in a word of objective objects and events but also in a vicarious or symbolic world in which he can combine phases of objective existence into new and unique patterns. He can create new objects and events in symbolic form which may become the plans for duplication of them in objective existence. Symbolic behavior has enabled man to become a creator.

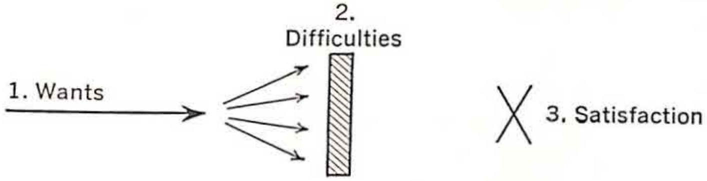
Reasoning. Reasoning, of course, is a form of thinking. It is that symbolic behavior which describes relationships and cause-and-effect sequences. Because of the ability to use sentence language, man has been able to analyze and describe attributes of events which he has designated as "cause-and-effect relationships." Not only has he been able to describe cause-and-effect relationships of past and present events, but he is able to *predict* such relationships in *future* events. By being able to understand the past and present, he is able to predict the future.

Meaning. This term refers to the knowledge of symbolic representation (or what symbols mean) and also to the knowledge of cause-and-effect relationships. The definition of a word or symbol is its meaning. The effect which follows a certain cause is meaning. Meaning is understanding or comprehending the significance of symbols, and of actual conditions and events. Take the word—*skive*. What does it mean? What does it symbolize? What thing or event is it used to represent? Or, I hear an unusual noise in my automobile. Wht does it mean? What does it symbolize? What is its significance? Or, I have just had the antenna on my television raised ten feet. What will be the effect? What does a higher antenna do that is not done by one ten feet lower? The answers to the above questions constitute meanings.

Creative thinking. All successful problem-solving involves creative thinking but the degree depends on the difficulty of the problem and the success of the solution. Creative thinking is perceiving new relationships. The boy who takes off his shoe and uses it to drive a nail, in lieu of a hammer, is creative—but not very much so. That creativeness is on a low level. Such unusual use of a shoe is fairly commonplace. It is not creative enough to be classed as such. On the other hand, the first man (Jack Armstrong) who built a carriage with the brake operating against the hub of the wheel instead of against the tire, was creative. It made possible the use of rubber tires instead of iron. (This brake was later used on automobiles.) Creative thinking is simply perceiving new ways of solving problems. The degree of creativeness depends on the complexity of the relationships and their social significance.

PROBLEM-SOLVING

Problems may range in difficulty from simple subhuman search for food to attempts to reduce time and space to single dimensions. All problems, however, on both the animal and human levels are in response to the satisfaction of want. Problem-solving is the procedure of satisfying wants. Figure 15-1 is a graphic representation of any problem-solving situation. The want may be for food, or for an inexpensive method of manufacturing gold, or for a scientific explanation of thinking. The difficulties which interfere with a want satisfaction may be those of personal inability, or of social restrictions, or of physical interference. A few typical examples of experi-



1. *Wants*
    - *a.* Basic or Primary (Unlearned. Sometimes called "instincts.")
        - (1). Organic—food, air, water, excretion, rest
        - (2). Sex
        - (3). Activity
        - (4). Maternal love
        - (5). Avoid pain, illness, and death
    - *b.* Derived or Secondary (Learned but almost universal.)
        - (1). Excitement
        - (2). Companionship
        - (3). Popular approval (includes leadership)
        - (4). Information (curiosity)
        - (5). Worship
        - (6). Competition
    - *c.* Individualistic or Tertiary (Personal peculiar wants.)
        - Too many and varied to enumerate
2. *Difficulties*
    - *a.* Environmental
        - (1). Physical limitations—time, space
        - (2). Social limitations—customs, regulations, restraints
    - *b.* Personal
        - (1). Hereditary—sensory range, intelligence, strength
        - (2). Attitudes—ideals, prejudices, likes, dislikes
3. *Satisfaction*
    - *a.* Personally acceptable—want satisfied, tensions relieved
    - *b.* Socially acceptable

FIGURE 15-1. Graphic illustration of any problem-solving situation

ments in problem-solving on both the animal and human levels will make the nature of problem-solving more clear.

A food maze used in studying problem-solving of white rats is shown in Figure 15-2. The problem for the rat is to get to the food box by the shortest route without wasting time in the blind alleys. A problem used in testing human ability is shown in Figure 15-3. A lighted candle is placed some distance from the subject. He is instructed to use the articles listed under A and blow out the candle. The solution is shown under B.

The rat, and many humans, solve problems by overt trial-and-error. They make attempt after attempt until they happen to satisfy their want. Because the rat is so much smaller than the maze shown in Figure 15-2, he cannot see whether an alley leads to the food box or not until he has made a trial trip. Even if he could, overt trial and error seems to be his only method of overcoming difficulties that interfere with the satisfaction of his wants. The intelligent student who is trying to solve the problem in Figure 15-3, however, uses a different approach. He makes many trials to be sure, but he is constantly talking to himself (thinking) about the problem and

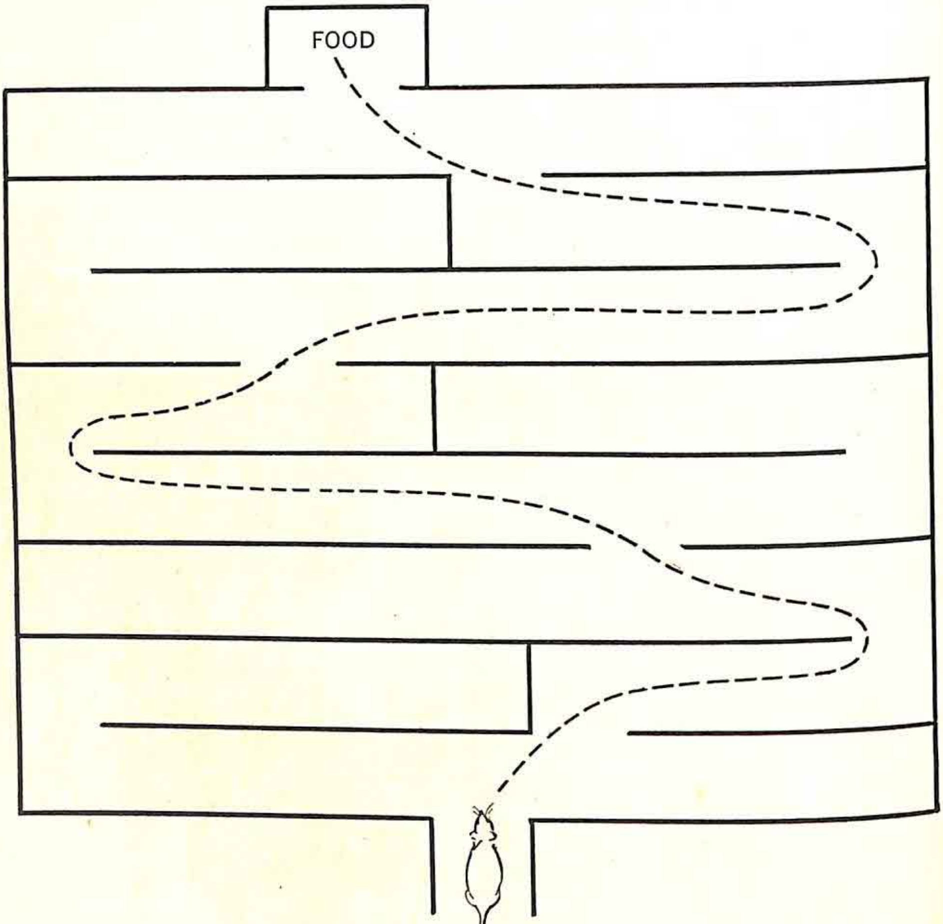


FIGURE 15-2. A *problem food maze for white rats*

possible solutions. He often solves the problem "in his mind" before he tries out the solution. The following implicit language behavior (made overt or aloud by direction) illustrates the "mental activity" that went on in one boy when he tried to solve the problem presented in Fig. 15-3.

> The candle is too far away to blow out or to fan out with my hand. Here are glass tubes and rubber tubes but they are too short to reach to the candle from here. These poles will reach nearer but they are not hollow. I could join these tubes together by alternating the glass ones and the rubber ones. (He does this.) Now that I have them joined they are too limber to hold out straight. If I could get up above the candle and blow down, it would work, but there is no way of getting up. Anyhow, I am supposed to stand behind this line. These poles are rigid enough. If I had a string I could tie the tubing to the poles. Perhaps I can clip them together. Sure, that is what these clips are for. (The tubing was then clipped to the poles as shown under B in Fig. 15-3.)

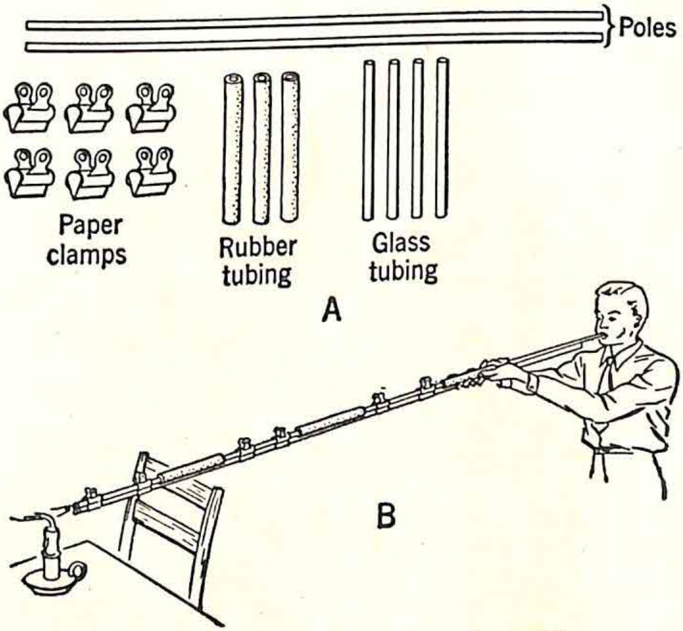


FIGURE 15-3. ***Maier's candle-blowing problem***

Subjects were to use the "tools" shown under *A* and blow out a lighted candle some distance away. Solution is shown under *B*.

Note that the only overt trial was the successful one. An error trial was made on the language level (to get above the candle so as to use the limber tubing) but its failure was also discovered on the language level. There were no blind trials, such as made by rats in the food maze shown in Fig. 15-2.

When problems are solved vicariously by the use of symbolic behavior, it is called *thinking*. Apparently animals are not able to use symbolic behavior on this level. Experiments by Koehler indicated that monkeys are able to fit jointed bamboo pieces together and make a pole long enough to reach food, but there is no evidence that they can presolve problems vicariously before fitting the sticks together.[1] There is no evidence that their behavior is according to *plan*. Planned behavior is apparently a human trait exclusively.

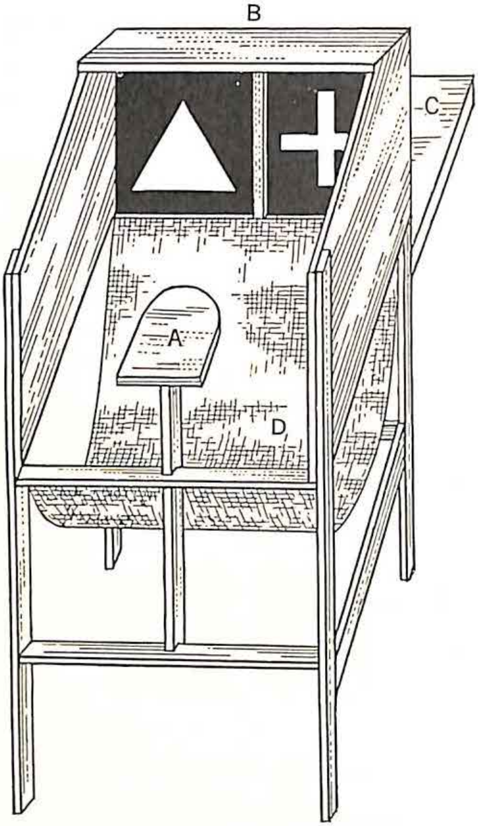


FIGURE 15-4. ***Lashley's Discrimination Apparatus***

The rat is placed on platform *A* and must jump through the door at *B* to reach the food on platform *C*. The door with the triangle on it will open but the one with the cross on it is locked. Penalty for choosing the wrong door is to fall to the net *D* below.

Typical experiments in animal problem-solving. One of the pioneer experimenters in animal problem-solving was Wolfgang Koehler [1] of the

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[1] W. Koehler, *The Mentality of Apes* (New York: Harcourt, Brace and Co., 1925).

University of Berlin. He worked with apes (chimpanzees) and created simple problems which his animals could solve without great difficulty. He placed food (bananas) out of the animal's reach and then provided materials which could be used to secure the food. For example, he suspended food from the ceiling too high for the ape to reach it. He then placed three boxes in the cage which could be piled on top of each other and used as a platform to reach the food. Many of Koehler's apes were able to do this and secure the food. Another problem was to place the food outside the cage beyond reach. Sections of bamboo which could be joined together to make a stick long enough to reach the food were placed in the cage. Again, many of the apes could solve this problem.

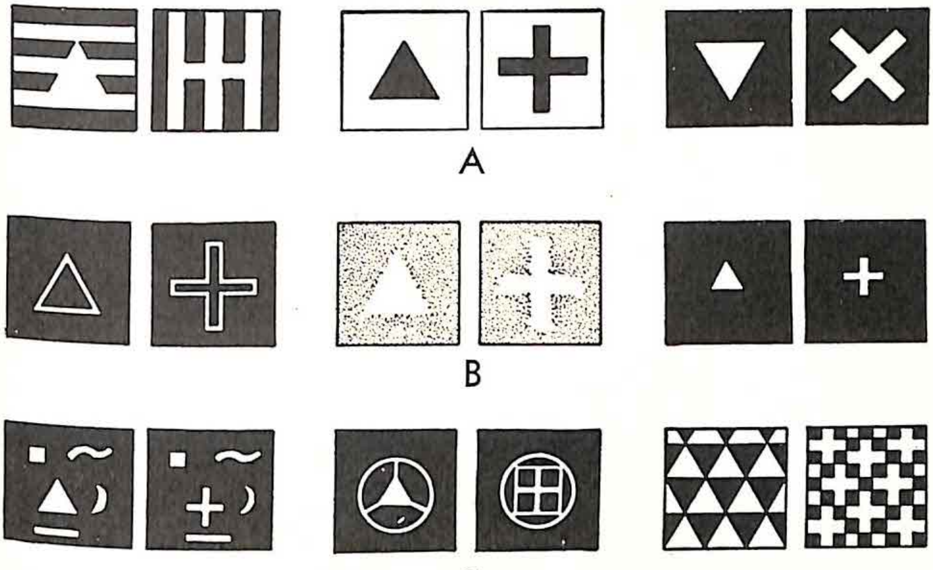

FIGURE 15-5. Variations in designs used with the *Lashley discrimination apparatus*

Koehler's experiments led him to conclude that apes are able to understand cause-and-effect relationships on a low level. They are able to perform preliminary steps (piling the boxes up) leading to the final step of attaining the goal. More recent experiments with animals confirm this conclusion.

Lashley's experiments were with the ability of white rats to discriminate between two designs on the doors of a food box (see Fig. 15-4) and then solve discrimination problems of related designs.[2] His rats were first trained to select the door on which there was a white triangle in a black field and to avoid the door on which there was a white cross in a black field. The

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[2] K. S. Lashley, "Studies of the Rat's Capacity for Detailed Vision," *Journal of General Psychology*, Vol. 18 (1938), pp. 123-193.

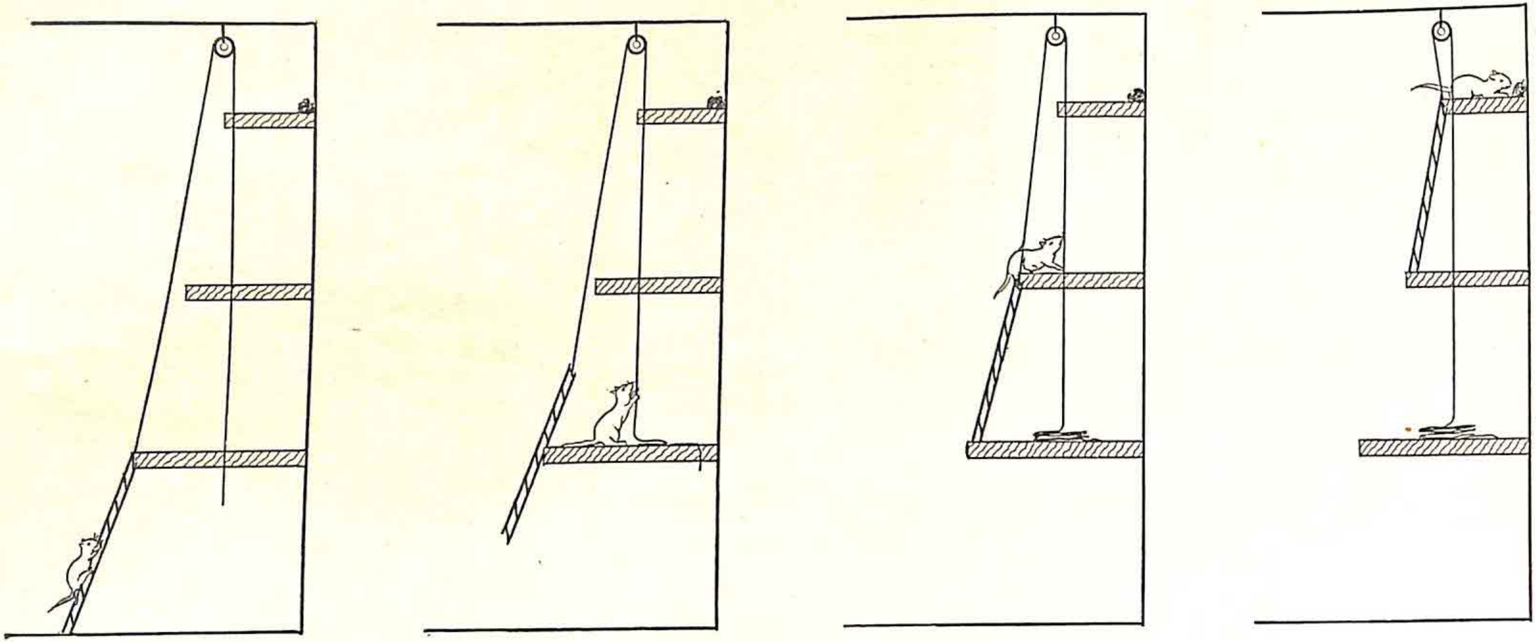

FIGURE 15-6. ***Tsai's ladder-climbing experiment***

Rats learn to pull the string and draw the ladder up to the next level. They repeat this until they reach the top shelf where the food is located.

penalty for error was to fall to the net below. After this learning had been accomplished, the rats were given discrimination problems which involved triangles and crosses in a variety of designs. Lashley found that the rats could "find the triangles" in certain designs but were unable to in others. The three pairs of designs in line A, Fig. 15-5, were too difficult. The rats could not see the triangles. The designs in lines B and C, however, were not so difficult. The rats could jump to the door with the triangle design and avoid the door with the cross design.

Loh Seng Tsai of Tulane University has been able to teach white rats to overcome highly complicated difficulties in order to reach food. In one experiment his rats learned to pull a ladder up from one level to another to reach food located three levels above the floor. A sketch of the rat's procedure is shown in Fig. 15-6. To raise the ladder the rat had to pull a string which was attached to the ladder through a pulley in the ceiling.

The above experiments in animal problem-solving illustrate a procedure that goes on in basically the same way on the human level. The animal has a want with no known method of satisfaction. He next explores and makes repeated efforts to satisfy his want. He eventually finds a solution. His explorations increase his knowledge of the problem situation. His trials and errors narrow the locale of the solution. The problem becomes easier as knowledge increases and errors become identified. Of course, with animals this is a slow process. A rat may make the same error over and over, but eventually he learns what errors are. His search for the solution gradually narrows down.

Typical experiments in human problem-solving. A very good study in problem-solving with human subjects has already been referred to in Fig. 15-3.[3] Maier believed that the important factor in problem-solving is *direction,* or orientation toward the solution. For example, any high-school student has all the information necessary to solve the problem in Fig. 15-3. But unless it is integrated with this particular problem situation it is useless information. Experiences and information from other situations must be integrated and directed to the problem at hand if there is to be a functional transfer.

To check the importance of direction or problem orientation, Maier gave a lecture of 20 minutes to 178 subjects on problem-solving. The content of the lecture was summarized by Maier as follows:

1. Locate a difficulty and try to overcome it. If you fail, get it completely out of your mind and seek an entirely different difficulty.

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[3] N. R. F. Maier, "An Aspect of Human Reasoning," *British Journal of Psychology,* Vol. 24 (1933), pp. 144-155.

2. Do not be a creature of habit and stay in a rut. Keep your mind open for new meanings.
3. The solution pattern appears suddenly. You cannot force it. Keep your mind open for new combinations and do not waste time in unsuccessful efforts.

Another group of 206 subjects were given no such orientation. Sixty-eight per cent of the orientated group were able to solve the problem in Fig. 15-3, whereas only 48 per cent of the unorientated group could solve it.

In another study, the same author gave "hints" to a group of subjects who had been unable to solve the problem shown in Fig. 15-7 in ten minutes.[4] In this problem the subjects were instructed to tie the two cords together. The distance between the cords, however, was too great to enable the subjects to reach one while holding the other. The only solution was to tie a weight (a pair of pliers was placed nearby on the floor) to one cord and start it swinging as a pendulum. Then while holding the other cord it was possible to grab the swinging cord in the near phase of the swing.

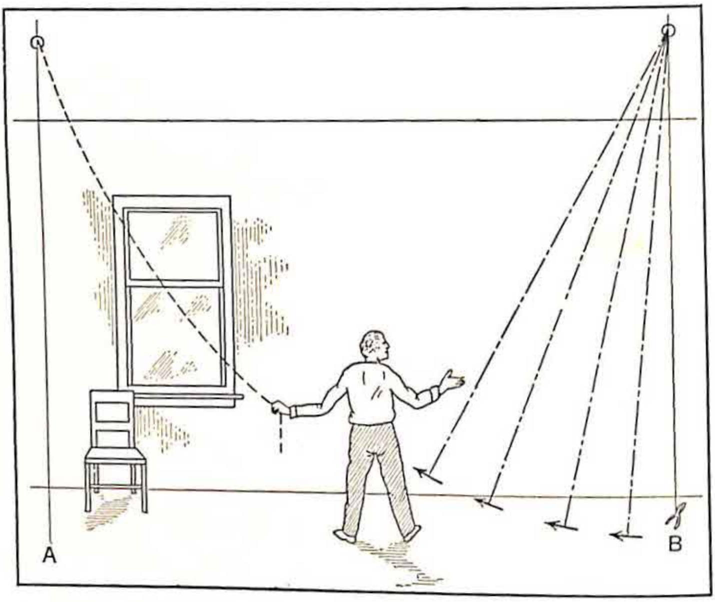

FIGURE 15-7. ***Maier's two-cord problem***

The "hints" given to 61 subjects who were unable to solve the problem in 10 minutes were as follows:

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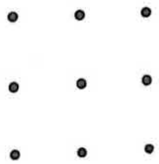
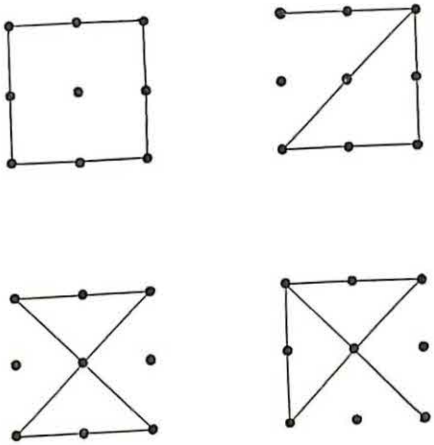
[4] N. R. F. Maier, "The Solution of a Problem and Its Appearance in Consciousness," *Journal of Comparative Psychology*, Vol. 12 (1931), pp. 181-194.

Hint 1. In walking past one of the cords, the experimenter "accidentally" brushed against it and started it swaying.

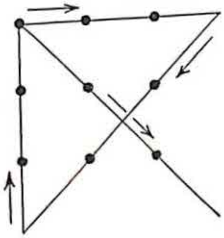
Hint 2. The experimenter handed the subject the pair of pliers, saying that the problem could be solved with these alone.



Problem: Draw four straight lines through each of the nine dots without raising your pencil



Erroneous solution attempts



The solution

FIGURE 15-8. The *nine-dot problem*

With these hints, 62 per cent of the subjects were then able to solve the problem within a time limit of 30 minutes. A control group of 55 subjects, who had also been unable to solve the problem in 10 minutes, received no hints or additional assistance. Only 20 per cent of them were able to solve the problem in the additional time limit. Obviously, the hints served to "direct" information, which the subjects had already, to the solution of the problem.

The inability of some problem-solvers to get out of a mental rut and look for a solution from new angles is further illustrated in Fig. 15-8. The erroneous solution attempts are all confined within the limits of the field outlined by the dots. The problem simply cannot be solved by such restricted thinking. The solution necessitates an entirely new pattern of thinking. The lines must be drawn *beyond* the field limits outlined by the dots.

This really means that habits and fixed ways of thinking can handicap problem-solving. It is necessary to recall old experiences and familiar objects in new relationships if they are to be used in solving new problems. To use a pair of pliers as a pendulum weight, as in Fig. 15-7, requires a break with old habits of using pliers and the perception of a new relationship. Even great inventions like the cotton gin are often simply the use of familiar information in new relationships. Other people than Eli Whitney knew that cotton seed is heavier than cotton fiber. Other people also knew that cotton fiber will catch on the teeth of a circular saw, and that that fiber can be removed with a brush. Others, however, did not relate this common information to the problem of separating cotton fiber from cotton seed. Eli Whitney was able to see old and familiar ideas in new relationships. He "directed" this information to the problem of separating cotton fiber from cotton seed. Such unusual and socially valuable problem-solving has been defined as "creative thinking."

Typical experiments in problem-solving on the mental or symbolic level. The problems discussed thus far could all be solved by overt trial and error with a minimum of symbolic function. While symbolic behavior was illustrated in the solution of the problem in Fig. 15-3, it is not essential and is used only by superior subjects. The following experiments concern problems that necessitate symbolic function. They are sometimes called "pencil-and-paper problems."

In his very excellent studies of problem-solving, Karl Duncker used a problem dealing with regulating the speed of a clock pendulum during temperature changes.[5] His subjects were instructed as follows:

> In order for a clock to go accurately, the swings of the pendulum must be strictly regular. The duration of a pendulum's swing depends, among other things, on its length, and this in turn on the temperature. Warming produces expansion and cooling produces contraction. Temperature changes produce

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[5] Karl Duncker, "On Problem Solving," translated by L. S. Lees, *Psychological Monographs,* Vol. 58 (1945), No. 5.

changes in the length of the pendulum and thus affect the speed of the clock's operation. How can the rate of the pendulum be kept constant during temperature changes?

The problem was a "pencil-and-paper" one and no materials were offered for actual experimentation. (Duncker asked his subjects to keep protocols of their thinking in chronological order.)

There were many proposals, illustrated in Fig. 15-9, some of which showed a comprehension of the problem and others which did not. Proposals *a* and *f* show no comprehension of the problem. They are "stupid errors" and would not stabilize the rate of the pendulum swing during temperature changes. Proposal *d* is the "customary solution" but *b, c, e,* and *g,* all "embody the identical functional value," although different in construction.

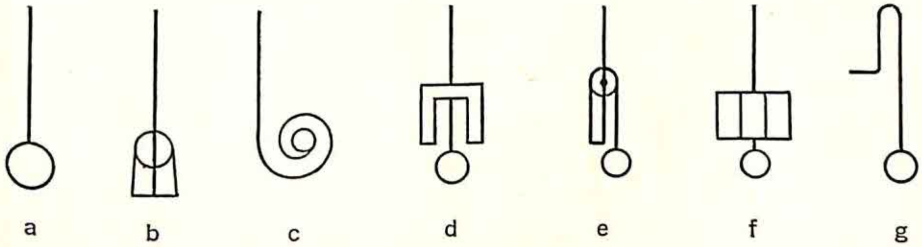

FIGURE 15-9. Proposals for solution of the *pendulum problem*

Downward expansion and contraction due to temperature change must be compensated for by upward expansion and contraction so the center of gravity in the pendulum will remain stationary. Some of the above proposals will do this and others will not.

From this and other experiments, Duncker concluded that problem-solving is essentially a process of reformulating or restructuring the problem. The pendulum problem that cannot be solved by keeping the clock in constant temperature is different than the pendulum problem was before this proposal was considered. The problem changes yet again after the proposal to "use material insensitive to heat" is considered. It finally becomes a problem of how to construct the pendulum so as to keep the center of gravity at a constant distance from the point of suspension. Duncker believes that what Maier calls "direction" is "nothing but the reformulation of the problem as it initiates the solution processes concerned." As solution progresses, the problem becomes delimited and the area of the solution becomes more definitely located. A problem near solution is not the same problem it was to begin with; and after solution it is no longer a problem at all.

Practically all problems in mathematics are on the symbolic level. Problems are stated in symbols and solutions develop in symbols. The following example is illustrative.

> Two trains are 150 miles apart and traveling toward each other. Train A travels at 60 miles per hour and train B travels at 40 miles per hour. How long before they meet each other?

Since the trains are not actually present the problem is one of symbolic imagination. Even if they were present, such a problem about action that has not yet taken place would of necessity be in the form of symbols. (All problems dealing with the future are symbolic in nature.) Likewise the solution of such a problem must be in symbols. The following is a typical language solution of the above problem.

> In one hour train A will travel 60 miles and train B will travel 40 miles. They are then 100 miles nearer each other (60 + 40) but they are yet 50 miles apart (150 — 100). This is just half the distance they can travel in one hour and will take just half as long, or 30 minutes. Consequently, the total time necessary for them to meet will be 1.5 hours. Train A will travel 90 miles in that time (60 × 1.5) and train B will travel 60 miles (40 × 1.5).

A mathematician would use a more economical way of solving the problem. His symbolization may be as follows:

$$\frac{150}{(60 + 40)} = 1.5 \text{ hours}$$

Tests composed of mathematical problems have been widely used in studying differences in age, intelligence, sex, race, etc. In fact, most studies of problem-solving on the human level have used mathematical problems.

ANALYSIS OF PROBLEM-SOLVING PROCEDURE

There are both similarities and differences between animal and human problem-solving. Both have wants, both search for conditions which satisfy those wants, both confront difficulties that interfere with want satisfaction, and often but not always both discover ways of satisfying wants. So far as is known, the animal can only perform these four steps on the overt, or manipulative, or performance level. The human, however, is able to do all this, and more, on a mental, or symbolic, or vicarious level. He can solve his problems in imagination, problems that may be remote in both time and space. He can cross his bridges before he comes to them. Mt. Everest was recently scaled because problems that came up on the expedition had been solved in England months and years before they actually arose. Man can anticipate problems, anticipate difficulties, and anticipate the outcome of possible solutions.

Concepts. Perhaps the greatest value of symbolic behavior is in the formation and use of concepts. It was pointed out in Chapter 14 that concepts grow out of experiences. The animal and the young child can respond only to specific concrete objects and events. The child can count five apples, five fingers, five marks on the blackboard. He can recognize the use of mathematical symbol 5; but five for him is always something concrete. Five is a part of specific situations. It is either a number of something or a specific symbol. As he matures he begins to see that five can be applied to *new* situations. Five is not an inherent part of apples, or fingers, or marks. Five is not something you can lift and weigh and handle. It is a concept, an abstraction, a generalization, a symbolic response.

Concepts may be restricted and elementary or they may be broad and "full of meaning." A child whose concept of five is limited to counting objects is on a most elementary level. Later he will learn that this concept is applicable to a wide variety of situations and in a wide variety of ways. For example, five as an exponent of another number is a more advanced meaning of the concept. Much education is a procedure of amplifying concepts, seeing them in new relationships, giving them new meanings. Even civilization itself grows as its concepts grow and attain new meanings and new relationships.

Maier and Duncker both observed in their experiments that problem-solving necessitates a "reconstruction" of the problem situation. The data available for solution must be seen in a new relationship—one that is appropriate to the problem at hand. This means that the problem-solver must use concepts or generalized meanings rather than specific meanings. He must understand general principles of function as well as specific function. So long as the pair of pliers in Fig. 15-7 were thought of as merely a tool to hold objects, they were of no value in solving the problem. The pliers as pliers had no place in the solution. Only when the concepts of weight and pendulum function were understood and applied to the problem did the pliers (or any other available object of weight) become a part of the solution procedure. Whitney could never have invented the cotton gin if he had thought of the circular saw merely as a device for sawing wood. It was the concepts of specific gravity and centrifugal force that made possible the cotton gin.

Two of the major functions of education are—first, to teach children concepts or meaningful information, and second, to teach them how to develop new concepts. All information is not meaningful. A little Illinois farm boy had learned his geography lessons well. He knew where the Mississippi River originated and where it terminated. He could name all its tributaries. He knew its length and even the number of gallons of water it poured into the Gulf of Mexico each hour. Then, one day during the summer as he helped his father hoe corn along the shore of the Father of Waters, he said, "Dad, I wonder if the black streak down the map in my geography book called the Mississippi River isn't the same as Ole Mis' at the back of this cornfield." The boy had learned geography facts without much meaning. The teacher should be sure that her pupils are learning meanings as well as facts. The rote memory of meaningless facts cannot be properly labeled education.

But education must not be limited to teaching meaningful information, important though it is. Pupils must also learn how to develop meanings for themselves. Information about swimming is important, but the boy must also get into the water if he is to learn to swim. Education must be learning *how to do* as well as learning *how others have done*. Schools must be *doing* schools as well as listening schools. It is important for a child to learn how his ancestors have solved the problems of the past; it is equally important for him to learn how he is to solve the problems of the future. Knowledge acquaints a child with his social heritage; by new uses of that knowledge, he can contribute to the social heritage. Millions of concepts are described and stored in our libraries available for use. Few of them, however, are useful without modification and adaptation to our modern age. Concepts are best formed when education is both acquisition of knowledge and the experience of using it in a variety of practical situations.

This justifies the "problem-solving procedure" in education. (Other names for this are the "project method" and the "activity curriculum.") Here children learn how to *use* ideas. They learn how to discover and formulate concepts. School life is more practical and realistic. For example, a school may publish a school paper. The children then learn grammar and composition as a by-product of preparing copy. They learn arithmetic by keeping accounts of costs and expenditures and income from the paper. They learn geography by writing feature stories of various countries. They learn history by preparing interpretive articles on current events. Useful learning is thus obtained *in context*.

Obviously such spotty and unorganized learning should not constitute the whole of the educational process. Concepts should be learned in applica-

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Experimentation is important in problem-solving

tion but their relationships and meanings beyond immediate use should not be omitted. It is important to supplement problem solving experiences with discussions and interpretation of meanings.

Steps in Problem-Solving. Problem-solving as a procedure in school learning is recommended because so much life after school involves problem-solving. If a child learns how to solve problems while in school, he is thus being prepared for one of the most important functions of his after-school life. Problem-solving as a method of school procedure has two values. First, knowledge is more meaningful if it is learned in the process of use. Concepts are easier understood when they are learned in functional situations instead of detached from useful application. Learning which occurs in useful context will transfer to new situations with greater ease than learning which is acquired by mere reading and listening. (See Chapter 16 on Transfer of Training.) Second, when school work involves the process of solving problems, a technique of problem-solving is acquired which comes very slowly if there is no instructional supervision. The following steps in effective problem-solving will, if followed, make the procedure less difficult.

1. *Understand the problem.* The problem itself should be exactly stated; the conditions which constitute the solution (or satisfy the want) should be accurately described; and the difficulties which apparently interfere with the solution should be stated clearly. Problems become less difficult when they are clearly and definitely described.
2. *Collect available information.* Libraries are full of information of how problems have been solved by others. Some of that information may be related to the particular problem under consideration. Other information may have to be obtained in other ways. It always saves time to become well informed about a problem to be solved.
3. *Discover possible solutions.* As information is collected about a specific problem, suggestions will arise regarding solution. These "hunches" may grow into solutions. Each possibility should be recorded and considered carefully (which is the next step).
4. *Evaluation of possible solutions.* One of the differences between intelligent and unintelligent problem-solving is the degree of accuracy in performing this step. A brilliant person can "think a possible solution through" and foresee whether or not it will work. But only a part of this ability to evaluate a possible solution is brilliance; another part is the painstaking detail with which the application of the solution is applied to the specific conditions of the problem. The ability to imagine exactly what would happen if the problem were solved in the manner being considered, can be developed by training. The habit of crossing bridges in imagination before they are reached can be developed.

   This is basically a reasoning step; an attempt to understand what is cause and what will probably be effect under the specific conditions of a problem situation. The effectiveness of reasoning depends on two things—the amount of information known and understood, and the exactness with which this information is applied (in language description) to the condition of the problem situation.
5. *Try out the best solution.* One never knows for sure that a solution will work until it is actually tried. Armchair speculation is important but it must be followed by test. Untested theories never justify dogmatic defense. Opinions should never be confused with facts.

Infallible evaluation and prediction in step 4 makes step 5 merely one of demonstration. Most problems, however, are too complicated to make such high accuracy possible. Usually, opinions resulting from the evaluation of possible solutions are tentative until they are tested in actual trial. Then they are modified to fit the facts. Sometimes predicted solutions are entirely wrong and new information must be obtained; new possible solutions discovered and evaluated. In other words, a difficult problem may require several repetitions of all the above steps of solution.

A typical example of how a University student used the above steps in solving one of his own problems is illustrated below:

> Donald Jones graduated from high school at the age of eighteen and decided to go to college because his father wanted him to go and several of his friends were going. He decided to go to *X* University, because it was near and his friend was going there. He enrolled in the School of Engineering because that was the course his roommate was taking and he had a vague notion that it might enable him to see the world.
>
> At the end of the first semester Donald's grades were so low that he was put on probation. He studied hard, or so he thought, during the second semester but again received low grades and was called to the dean's office and advised to drop out. This worried him a great deal. He did not wish to drop out and admit failure and he did not wish to continue and be kicked out. Entirely unlike any other adjustments he had ever faced, there did not seem to be a solution into which he could drift. The problem did not solve itself nor did any of his friends solve it for him. His past habits of drifting and relying on others would not work.
>
> Donald was advised to confer with a professor of psychology, which he did. A careful study was made of his problem and the various factors that seemed to be related to it. When the diagnosis indicated that the solution was rather obvious, Donald was encouraged to apply the scientific method to his difficulty. The following analysis is quoted from Donald's own report.
>
> *Problem:* How can I avoid becoming a failure in the School of Engineering?
>
> *Subproblems:*
>
> Do I really want to become an engineer?
> Do I have the necessary ability?
> Am I better qualified to go into some other vocation?
> Do I know how to study?
>
> *Data:*
>
> Tests showed that I am interested in engineering, I have adequate ability to become an engineer, I am not fitted better for any other vocation, my mental ability is superior to the average college student. However, I do not know how to study effectively. My case history indicates that my past grades were better than I deserved. My father was on the school board and cashier in the bank, which probably influenced some of my teachers. I was an athlete and the school emphasized sports.
>
> *Plan for solution:*
>
> I will study under the psychology professor's supervision for a summer term and learn how to study properly.

Evaluation of the plan:

This ought to work because I floated through high school and did not even try to study. I came from a small town where it would have been unpopular for a teacher to flunk me. It will be cheaper to pay this professor for tutoring than it will be to scrap the year I have already spent in school.

Test of the plan:

I was first required to make out a schedule of what I planned to do every hour of the day. I was not allowed to deviate from this plan, unless it was approved in a conference with the professor. I then learned to read carefully and take notes on the important ideas. This was harder work than I had ever done before and I was putting in more hours than I had ever put in before. At first I got behind. I could not cover as much material as was assigned. After about a month things began to be easier I gradually learned to concentrate and it did not take as long to get the ideas from a page. At the end of the six weeks summer term I had learned what to do but was yet unskilled in doing it. The next fall I was on my own but reported to the professor occasionally. The plan worked.

Conclusion:

Since I have learned how to study my courses are more interesting and I am making satisfactory grades. My greatest benefit was learning how to solve problems of adjustment.

SCHOOLROOM PROCEDURES IN PROBLEM-SOLVING

Now, the $64 question is—What schoolroom procedures will teach children how to solve problems most effectively? The answer is not too difficult. The preceding chapters in this book have emphasized the fact that the child learns to do just what he is doing. Learning is a product of behavior and *what is learned depends on what is done*. School procedure must consist in doing whatever we want the child to learn to do. If we want him to be able to solve problems after he gets out of school, we must give him the experience of solving problems while he is in school. The method of education should be the *problem-solving method*.

The problem-solving method of teaching the immature is perhaps as old as culture itself. Certainly it is used today on the most primitive cultural levels. As a technique of formal education, however, it dates from John Dewey's Laboratory School at the University of Chicago in 1896. Dewey's foundation principles of education were stated a follows:

> The child is the starting point, the center and the end. His development, his growth, is the ideal. It alone furnishes the standard. To the growth of the child all studies are subservient; they are instruments valued as they serve the needs of growth. Not knowledge or information, but self-realization is

> the goal. Subject matter can never be gotten into the child from without. Learning is something he does to himself. [6]

Dewey's activity movement soon developed into the "project method" where academic learning became a byproduct of performing some "purposeful activity for its own sake." School *work* became school *play* and was "pupil-planned, pupil-executed, and pupil-judged." The old systematic organization of subject matter was discarded. Learning content was now determined by immediate need.

While Dewey's "progressive education" movement did a lot to "humanize" some education and make it more interesting for the child, it was not too effective in preparing pupils for state board and college entrance examinations. Consequently, few public schools did more than give verbal approval to Dewey's ideas. The typical pupil in the typical school continued to either listen to the teacher talk (lecture) about something which was of no vital interest to the child of that age, or to laboriously study about something equally as remote from his active, living needs. Public education refused to become vitalized and vacations continued to be the oases of child living. The situation is but little changed at the present time (1954). Too little education is appropriate for the age and interests of the children being taught and some is even useless at any age. Public education today is shackled by tradition. Governing school boards are composed of successful men who attribute their success to education as it was when they were young. They believe that nothing better can be done for their children. They will tolerate but limited progress in education.

While the educational psychologist agrees with the idealism of John Dewey, he also recognizes and understands the necessity for local and lay control of education in a democracy. Regardless of what *should* be done, the practical problem is rather what *can* be done to improve the educational process in our public schools. Education must occur within the framework of the present curriculum whether it is interesting and useful to the child or not. Certain facts and skills must be learned at certain definite grade levels and recommendations for procedures outside those limits are unrealistic.

The interest and significance of problems, however, depend on the nature of the environment from which they arise. A group of children going through a zoo, for example, ask all sorts of questions which could easily develop into problems about animals. Problems always arise out of the environment. An ordinary classroom without *selected* environmental bric-à-brac is not a good environment for any sort of problem-solving. When a unit of study concerns animals, and a zoo is not nearby, an adequate environment can be created in the classroom from which problems regarding animals will arise. Pictures of animals, books about animals, statuettes of animals, household pets, and even small caged animals can be used to suggest worthwhile problems about animals.

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[6] John Dewey, *The Child and the Curriculum* (Chicago: University of Chicago Press, 1902).

The following example sketches how one teacher conducted a unit on the fifth-grade level about colonial life. While this report is too brief to include details of the rich experiences the children had in these co-operative activities, it does suggest a procedure that can be used in making the process of attaining useful knowledge and skills interesting and enjoyable.

UNIT—COLONIAL LIFE (Fifth grade)

I. *Classroom environment for intitial stimulation and development of interest.*
  1. Maps of early colonial settlements
  2. Pictures of various phases of colonial life
  3. Books from the library concerning colonial life
  4. A flint-lock rifle and powder horn
  5. A coonskin cap and other clothing suggesting colonial times

II. *Activities which were co-operatively planned and performed by the teacher and pupils.*
  1. Constructed small log cabin with fireplace and chimney
  2. Made authentic accessories for the cabin—table, chair, cradle, fireplace, crane, candle and candle stick, wooden bowl, wooden ladle, gourd dipper, twig broom, Dutch oven, braided rug, hook rug, trundle bed, etc.
  3. Assembled from homes—tanned skins, moccasins, deer antlers, old hoe, old clothing, old books, etc.
  4. Learned pioneer songs and dances—"Pop Goes the Weasel," "Uncle Steve's Quadrille," "The Minuet," etc.
  5. Wrote stories, essays and reports on various phases of colonial life, such as, great preachers, politicians, authors, educators, and hunters; religion; relations with the Indians; etc.
  6. Read about and held group discussions on topics concerning colonial life—such as, government, education, religion, making a living, recreation, courts and penal procedures, etc.
  7. Invited parents for an afternoon tea and entertainment—put on a play about colonial life and prepared refreshments typical of colonial times.

III. *Educational outcomes from the activities performed during the unit study.*

1. Learned names, locations, dates, and reasons for the various settlements along the Atlantic coast.
2. Learned about the hardships our forefathers went through in transforming a wilderness into a civilized settlement.
3. Learned how to use hand tools and plan the construction of various articles.
4. Learned how to co-operate with other children in group activity.
5. Developed ability to write, spell, plan, report, read, calculate, and anticipate outcomes.
6. Developed an appreciation for America and our American ways by learning of the difficulties of creating a nation and a way of life.
7. Learned that "school work" can be interesting when it is performed as co-operative, planned activity.

SUMMARY

Man's greatest superiority over the lower animals is his language ability. It enables him to live in a vicarious world which may be a copy of the past, or a prediction of the future. By language man can transcend both time and space. But better yet, it enables him to analyze cause-and-effect sequences and calculate effect from controlled cause. This is thinking, the highest level of problem-solving.

Experiments indicate that stereotyped or habitualized thinking often interferes with successful problem-solving. Objects and events must be seen in new relationships. Creative thinking is "getting out of the rut" and using familiar tools in new ways. Great inventions are old ideas in new combinations. School children should be given opportunities and encouraged to do this.

Questions and Exercises

1. Ignore definitions given in this Chapter and write down your own definitions for each of the terms defined. Then, *justify* your definitions over those given in this chapter.
2. Take one of your own minor problems and classify the want and the difficulty according to Figure 15-1. Then write up each of the steps in solution except #5 Why should you delay performing step 5?
3. Which of the steps in problem solving are *not* performed by lower animals? Which are *not* performed by ignorant people? Which are often neglected by you?

4. Compare animal motives and human motives in strength, exactness, duration, freedom from social pressure, modifiability, and ease of inhibition. What distinguishes human motivation from animal motivation?

5. As you solve the following problem, observe exactly what you do. What nonlanguage behavior did you use?

   Problem—The Moose Indians were all liars. The Elk Indians were all truthful. Three Indians met one day in the woods, let us call them X, Y, and Z.

   Said X to Y, "You are an Elk."
   Said Y to Z, "You are an Elk."
   Said X to Z, "You said you were a Moose."

   To which tribe did each Indian belong?

6. What are the dangers of learning to think in a dictatorship?

7. To what extent is a conventional laboratory experiment in physics a problem-solving experience?

8. What is meant by creative thinking? How is this different from and how is this similar to reflective thinking?

9. For a more complete understanding of problem-solving among college students the student is referred to Benjamin S. Bloom and Lois J. Broder, *Problem-Solving Processes of College Students*. Supplementary Educational Monographs, No. 73 (1950). The author presents in Chapter 2 the errors made by college students in solving problems. Study the nature of these errors and determine the degree to which they reflect low mental ability, inadequate data, and faulty methods of reasoning.

Recommended Readings

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CHAPTER 16

Transfer of Training

THE ASSUMPTIONS underlying education today, just as they were in the past, is that knowledge and skills acquired at school will be useful in the solution of problems encountered in everyday life. All educational efforts aim at learnings which can be transferred to new situations. Some of these new situations are to be met within the school curriculum; others are met in life situations outside the school. Ultimately it is to the latter type of situations that educational interests in transfer are pointed. When a particular learning experience influences an individual's ability to respond effectively to stimuli different in some ways from those he reacted to during learning, transfer of training is said to have taken place. If transfer were not possible, it would be necessary to train the learner to respond effectively to every specific situation he is likely to face in the future—an endless and impossible task.

THE NATURE OF THE PROBLEM

There are several important psychological questions involved in the problem of transfer. For educational purposes two of these questions are most important. To how wide a range of different situations will a particular learning transfer? What instructional methods will promote the greatest amount of transfer? These and other related problems will be discussed in this chapter.

Formal discipline. The classical curricula of the nineteenth century was built upon the idea that the student studied Latin, Greek, logic, and mathematics because of their value in training the mind. The basic idea back of such a notion was that the mind was divided into faculties and that the exercise of any of these faculties would tend to strengthen the particular faculty. Training in mathematics would enable the student to solve difficult problems involving accuracy and careful observations; while the study of logic would enable the student to deal with issues in an orderly manner and with profound insight. The theory of "formal discipline" has had an important influence upon the high-school and college curriculum, and unfortunately much of this influence exists today.

Some students of education have tended to confuse formal discipline with transfer of training. Although the two are not diagonally opposed to each other, they are far from synonomous. The notion of formal discipline was based upon certain theories about the nature of mind—theories for which there was no basis in scientific findings. According to the doctrine of formal discipline the learning of certain materials, such as mathematics, strengthens the faculties of the mind, particularly the reasoning faculty. Thus, the learner develops an increased reasoning power applicable to all situations. Modern theories of transfer recognize that through functional teaching of mathematics the learner may acquire habits of organizing materials used in reasoning which may be applicable to a wide range of problem situations. Such habits would then enable the learner to reason more effectively on many problems other than those of a mathematical nature. The theory of transfer is well established. The extensive research in this field has furnished useful information about how it occurs. Materials bearing on this will be presented later in this chapter.

Early studies of transfer. The early experimental attack on the problem of formal discipline was essentially critical in nature. This was a reaction against the exorbitant claims made by many scholars of the values to be derived from classical knowledge. This may be noted in the challenge by William James (1890) in which he attempted to measure the effect of training in memory. He and four of his students recorded the time taken to memorize passages consisting of 158 lines from Hugo's *Satyr*. Following this, they practiced daily memorizing selections from Milton's *Paradise Lost*. After a period of daily practices at this they again recorded the time taken to learn new passages from Hugo's *Satyr*. Three of the students showed a slight improvement, while James and the other student found no improvement. These results, although inconclusive and somewhat crude in nature, laid down a serious challenge to the doctrine of formal discipline. They furthermore stimulated further research on this problem.

Munsterberg in Germany and Thorndike in America during the early part of the twentieth century furnished evidence supporting the conclusions suggested by the study by William James. In the study by Thorndike, carefully devised intelligence tests were administered to a large number of high-school students at the beginning and again at the end of the school year.[1] The gains made by the students on the intelligence test were then studied in relation to the particular subjects which they had studied in their school program. Due regard was given to the normal growth in intelligence which might be expected to take place during the year. After allowance was made for this and the effects of practice upon the test results, the amount of gain was studied in relation to the different school subjects which the students had studied. This study was repeated at a later date.[2] The net final results of these two studies are presented in Table 16-1.

TABLE 16-1. *Differences in gains between pupils taking a given subject and pupils of the same mental ability taking one or nothing in place of it*

	DIFFERENCES IN GAIN		
SUBJECT	1922 1923 STUDY	1925 1926 STUDY	AVERAGE
Civics, etc.	.27	5.50	2.89
Biology, etc.	.90	.60	.15
Arithmetic, etc.	2.92	2.28	2.60
Algebra, Geometry, etc.	2.33	3.64	2.99
Latin, French	1.64	.07	.79
Cooking, etc.	.47	.19	.14
Physics, etc.	2.64	2.77	2.71
Dramatics, Art	.29	.67	.48
Physical Training	.66	1.00	.83
Physiography		3.38	

These results reveal that the differencs in gain made as a result of taking one subject rather than another was very small. They further agree in showing that Latin, algebra and geometry are not the important disciplinary subjects that they have traditionally been claimed to be. The average gain for students taking these subjects was 1.89, which was actually lower than the gains for the physical science and civics groups.

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[1] E. L. Thorndike, "Mental Discipline in High School Studies," *Journal of Educational Psychology*, Vol. 15 (1924), pp. 1-22, 83-98.

[2] Cecil R. Broyler, R. L. Thorndike, and Ella Woodyard, "A Second Study of Mental Discipline in High School Studies," *Journal of Educational Psychology*, Vol. 18 (1927), pp. 377-404.

Experimental procedures for studying transfer. The early experimental studies of transfer suffered from a number of factors. Oftentimes results were based upon to few cases, in other cases the experimental design was not clearly conceived, and in many cases the different factors involved in learning were not controlled. Later experiments have included larger groups of subjects and have attempted to study the effects of such factors as methods of learning, attitudes, and intelligence upon the amount of transfer. Also, more recent studies have attempted to control certain factors not controlled in the earlier studies.

These studies have usually included two groups of subjects, the *experimental group* and the *control group*. These groups are in general equated and given a pretest on area A. The experimental group is then given special training in Area B, the area or activity under study for transfer, while the control group is given no such training. After a period of training both groups are given a second test in the same general area or activity for which they were originally tested. The amount of transfer from the activity pursued by the experimental group to the area for which both groups have been tested is then measured by the gains made by the experimental group on the second test in excess of those made by the control group. This procedure may be illustrated by the following pattern:

Experimental Group	Test 1 Activity A	Training Activity B	Test 2 Activity A	Gain Test 2-1
Control Group	Test 1 Activity A	No Training Activity B	Test 2 Activity A	Gain Test 2-1

RESULTS FROM SCIENTIFIC EXPERIMENTS

Many experimental studies dealing with transfer followed the pioneer studies by James and Thorndike. The results of these studies have in most cases been confusing, since some studies show a significant transfer while other studies of approximately the same problem show little or no transfer. The major studies of transfer from 1935 to 1940 have been summarized by Orata and are presented in Table 16-2.[3]

The confusion in the results obtained from different studies of this problem may be attributed to the following general factors: (a) the learning of the tasks under different conditions and with different instructions; (b) variations in the method employed by the experimenters in the evaluation of learning and transfer; and (c) the overemphasis on averages in drawing conclusions and making generalizations.

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[3] Pedro T. Orata, "Recent Research Studies on Transfer of Training, with Implications for Curriculum, Guidance, and Personnel Work," *Harvard Education Review*, Vol. 11 (1941), pp. 359-378.

The question may be asked: What are the psychological processes, functions, or behavior patterns which when learned in one situation can be transferred to another situation? Many studies have been conducted bearing on this question. A review of the results of some of these studies should be useful in arriving at the answer to this question.

TABLE 16-2. *Statistical results of transfer experiments from 1935 to 1940*

AMOUNT OF TRANSFER CLAIMED	CLASSROOM EXPERIMENTS	LABORATORY STUDIES	TOTAL	PER CENT
Considerable	4	2	6	14.0
Appreciable	7	8	15	34.9
Varies with conditions of learning	2	10	12	27.9
Slight	4	1	5	11.6
None	2		2	4.6
Evidence not clear	1		1	2.4
Interference		2	2	4.6
Total	20	23	43	100.0

Transfer of perceptual-motor learning. Experiments designed to determine the amount of transfer from learning one perceptual-motor task to the performance of another perceptual-motor task show a wide variety of results. Some suggest a great deal of transfer (positive), others reveal little or no transfer, while still other may produce negative results. In the latter case the learning of the first task actually interferes with the performance of the second task.

Marked transfer will be found in performances where there is a mere shift in sense organs. Learning to send a telegraphic message with fingers on the right hand would reveal considerable transfer, if the learner were required to shift to the use of the fingers of the left hand. Likewise, there will be considerable transfer of skill from one hand to the other. This was early demonstrated by Starch's experiment with the mirror drawing of a star. Individuals who had practiced drawing a star pattern with the right hand by the mirror drawing method were more skillful in drawing the star with the left hand than were subjects not given this practice. This is referred to as cross-education. The improvement resulting from such practice is, however, attributed to such factors as acquaintance with the nature of the problem, acquisition of special techniques and understandings, and changed attitude acquired toward the problem.

A careful study of sensori-motor transfer was conducted by Webb with both animals and human beings as subjects.[4] The subjects first learned to follow a pathway through a maze. They were then given the task of following a pathway through a number of other mazes varying in design and difficulty. The results revealed that there was a carry-over effect from learning the first maze to following the correct path through other mazes. The amount of carry-over varied with the nature of the maze and the individual subjects. Transfer was greatest when the new task was similar in nature to the original learning.

A number of studies have shown that training in the basic principles and techniques of music may have a widespread transfer. Furthermore, training in the manipulation of tools will be useful to the learner in many situations involving the use of tools. The specificity of psychomotor behavior in relation to learning and transfer of learning effects is a problem which is important to those concerned with programs involving such learnings. If individuals are trained in a performance at one speed how will this affect their performance at a different speed? In one study bearing on this problem individuals were given training in visual tracking of a target at a given velocity.[5] They were later tested in the tracking of a target at a different velocity. The resulting data showed significant differences between performances at the three target speeds studied. Practice with the visual-tracking apparatus appeared to be relatively ineffective as a means of increasing accuracy scores. The results revealed little transfer value for training when different target speeds were introduced. This study furnishes evidence for specific rather than general factors in perceptual-motor learning.

Transfer in memory. One of the outstanding claims of those who adhered to the doctrine of formal discipline was that memory was a unitary function or a mental faculty and could be improved through exercise. This aspect of unity was very important, since it provided the basis for improving the memory through any type of memory exercises. It was this problem that Sleight, an English psychologist, attacked through a carefully devised experiment.[6] Four groups, three experimental and one control, were selected for this study. Each of the groups was given memory tests for dates, nonsense syllables, poetry, literal prose, prose substance, and consonants. Following this the three experimental groups practiced for twelve consecutive days memorizing special practice material. One group practiced memorizing poetry, a second group practiced memorizing tables, and a third group practiced memorizing prose substance. Following the practice period all four groups were retested on the six memory tests of the test series.

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[4] L. W. Webb, "Transfer of Training and Retroaction," *Psychological Monographs*, Vol. 24 (1917), No. 104.

[5] Robert S. Lincoln and Karl U. Smith, "Transfer of Training in Tracking Performance at Different Target Speeds," *Journal of Applied Psychology*, Vol. 35 (1951), Vol. 35, pp. 358-362.

[6] W. G. Sleight, "Memory and Formal Training," *British Journal of Psychology* Vol. 4 (1911), pp. 386-457.

The most outstanding result of this study was that practice at certain memory tasks does not result in an improved memory. However, differences were observed in the effects of the different kinds of memory practice. In general, the results did show that practice in memorizing a particular kind of material had a beneficial effect upon memorizing other materials of the same kind. There were several cases of negative transfer found. For example, it was noted that memorizing prose substance had a negative influence on memorizing dates, nonsense syllables, poetry, literal prose, and consonants. Likewise, memorizing tables had an adverse effect on memorizing poetry, literal prose, and consonants.

The results of this experiment have been supported by other studies bearing on this problem. These experiments have given an unqualified answer NO to the question: Can general memory be improved through practice at memorizing some kinds of material [7] There is evidence, however, that methods and techniques of learning may be transferred. In an experiment by Woodrow, one group of subjects was instructed about the nature of efficient learning, including such topics as learning by wholes, use of the recitation method, use of special grouping, attention to meanings, mental alertness and concentration, and the use of secondary associations. Another group practiced alone, without any formal instruction. A comparison of the results of these two experimental groups with those of a control group showed a superiority for the group taught the principles of efficient memorization. This study furnishes further evidence of the value of developing good methods of learning as a means of improving one's ability to memorize.

Transfer in reasoning. It is rather difficult to study the transfer value of reasoning materials. Nevertheless, several worthwhile and fruitful attempts have been made to study this problem. Two groups of subjects each consisting of 38 twelve- and thirteen-year-old pupils from the seventh and eighth grades were used in one study of this problem.[8] The two groups were equated for intelligence and chronological age. These subjects were given initial and end tests, the task of which was to write the lesson conveyed by each of fifteen of Aesop's Fables. The experimental group was given twelve carefully prepared twenty-minute lessons treating several phases of simple analysis, abstraction, and generalization. The results for the initial and final tests for the two groups are presented in Table 16-3. The experimental group gained 64.03 per cent, while there was no gain registered by the control group.

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[7] H. Woodrow, "The Effect of Type of Training upon Transference," *Journal of Educational Psychology*, Vol. 18 (1927), pp. 159-172.

[8] M. C. Barlow, "Transfer of Training in Reasoning," *Journal of Educational Psychology*, Vol. 28 (1937), pp. 122-128.

A retest given to the two groups a year later tended to show a larger nonpractice gain for the experimental than for the control group. The results from this study indicate that a relatively large amount of transfer results from instructions on abstracting, analyzing, and generalizing. Furthermore, it was observed that when the final test materials differed entirely from the training materials, the amount of transfer was as great as when the end tests resembled the interpolated content. Barlow concludes:

> Transfer would seem to depend on the analysis of the mental steps involved in learning; on descriptions of various aspects of the problems under consideration; on proceeding from the concrete to the general and *vice versa* with respect to reasoning in the training materials, and on intentional efforts to apply learning methods.[9]

TABLE 16-3. *Average number of correct answers to fables in two end tests by experimental and control elementary-school subjects*

	TEST I	TEST II	GROSS GAIN	PER CENT GAIN
Experimental group	3.28	5.32	2.07	64.03
Control group	3.16	3.13	—.03	—.09

A study by Ulmer dealt with the transfer value of geometry to reflective thinking when the emphasis in teaching geometry was on the cultivation of reflective thinking.[10] An experimental group and two control groups were used in this study. In the experimental group a special attempt was made to improve the quality of the pupils' thinking by making use of the opportunity presented in geometry to study principles of reflective thinking. One control group of pupils was enrolled in geometry classes in which no particular emphasis was given to the principles of reflective thinking. The second control group consisted of pupils who were not enrolled in geometry courses.

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[9] *Ibid.*, p. 127.

[10] G. Ulmer, "Teaching Geometry to Cultivate Reflective Thinking: An Experimental Study with 1239 High School Pupils," *Journal of Experimental Education*, Vol. 8 (1939), pp. 18-15.

A reasoning test was given to all three groups at the beginning of the semester and another one at the end of the semester. The results of these tests for the three groups are presented in Table 16-4. These results show that there is a significant increase in reasoning ability from a study of geometry, when an attempt is made to apply the materials to principles of reflective thinking. However, when no such attempt is made there is no substantial growth in reflective thinking for pupils, except for those with an intelligence quotient of 120 and over.

TABLE 16-4. *Mean gains in reasoning test scores for low, average, and high ability students from each of three groups*

GROUP	IQ'S LESS THAN 100	IQ'S FROM 100-119	IQ'S OF 120 AND HIGHER
Experimental Group	24.2	25.2	30.7
Geometry Control Group	5.0	8.3	13.4
Non-Geom. Control Group	5.1	5.1	4.0

Transfer of methods of study. A number of students of educational psychology have attacked the problem of the transfer effects of how-to-study course upon accomplishments in different scholastic courses. (Special materials bearing on sound methods of study will be presented in Chapter 18.) The question with which these studies have been concerned is: Will the increased knowledge of good study habits actually transfer into actual practice and thus affect achievement in various academic subjects? This problem was early attacked by Pressey with college students as subjects.[11] A significant transfer was found among all students except those below the first quartile in intelligence.

A more recent attack on this problem was made by DiMichael with ninth-grade pupils as subjects.[12] Two groups of 96 subjects each were carefully matched for mental age, chronological age, sex, school year, curriculum, and teacher. The instruction for how-to-study was given to the experimental group in two 45-minute periods each week throughout a period of 27 class sessions. The control group was not given this special instruction. The transfer effects of the course was measured by gains made on tests in history, Latin, and algebra—courses taken by all members of

[11] Luella Cole Pressey, "The Permanent Effects of Training in Methods of Study on College Success," *School and Society*, Vol. 28 (1928), pp. 403-404.

[12] Salvatore G. DiMichael, "The Transfer Effects of a How-to-Study Course upon Different IQ Levels and Various Academic Subjects," *Journal of Educational Psychology*, Vol. 34 (1943), pp. 166-175.

both groups. These results for the different IQ groups are presented in Table 16-5.

TABLE 16-5. *Transfer effects of the how-to-study course upon different levels of intelligence in history, Latin, and algebra*

ACADEMIC SUBJECT	IQ LEVEL	MEAN GAIN OF EXPERIMENTAL OVER THE CONTROL GROUP
History	116.8	3.20
	108.8	7.41
	101.0	.96
	94.2	4.25
Latin	116.8	.48
	108.8	.86
	101.0	3.73
	94.2	.47
Algebra	116.8	.20
	108.8	.44
	101.0	2.55
	94.2	3.74

The results of this study support the earlier findings of Pressey that students of poor ability, that is below the first quartile in intelligence, do not profit noticeably from such a course. There is furthermore evidence from this study that students considerably above the average in intelligence do not necessarily profit from such a course. It appears that such students have been able to develop study habits sufficiently good to enable them to succeed.

A question may be asked: Does training in logical organization, practiced through the medium of outlines and summaries have a beneficial effect on pupils? A study by Salisbury attempted to answer this question, using 474 high-school pupils from English classes as subjects.[13] All the pupils were given a series of tests. The experimental group was then given special training involving carefully prepared lessons in outlining and summarizing. All pupils were again tested for reading and study skills. The results indicated that training in logical organization of materials produced a beneficial effect upon the reasoning ability and other study skills covered by the tests given the subjects.

Transfer in school. Many studies have been conducted dealing with the transfer value of different school subjects to other areas of learning encountered at school. Since the methods, materials, and individuals used in the studies varied with the different investigations, the results obtained from these studies are somewhat confusing. Only a few of the representative studies in the traditional fields will be presented here for special study and consideration. The findings from these investigations should give the student a better notion of (1) the nature of investigations conducted around the problem of transfer; (2) the general nature of the problem of transfer; (3) some factors which influence transfer; and (4) the amount of transfer that occurs under varying conditions in the school program.

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[13] B. Salisbury, "A Study of the Transfer Effects of Training in Logical Organization," *Journal of Educational Research*, Vol. 28 (1947), pp. 241-254.

The two principal reasons usually given in support of foreign language teaching are:

1. The study of the foreign language aids in the learning of English; principally its grammar.
2. The study of a foreign language aids in the enlargement and enrichment of one's vocabulary.

Many studies have been concerned with testing these hypotheses. Early experiments showed that students who had studied a foreign language had a greater knowledge of grammar and were more proficient in English usage than those who had not studied a foreign language. However, these differences were in most cases statistically unreliable. Furthermore, these early findings are untrustworthy, since there was no effort made to control the factors which led the foreign language students into such studying and which led the nonforeign language students away from it. A study was concluded by Douglass and Kittleson dealing with the effects of high-school Latin on English grammar, spelling, and vocabulary. They found that there was a slight transfer from Latin to these areas.[14] Again the results were not statistically significant. Pond, after careful matching of subjects, found little, if any difference in vocabulary knowledge on the part of Latin and non-Latin students.[15]

As an integral part of a nation-wide investigation conducted under the general direction of the American Classical League, Hamblen investigated the effects of the study of Latin upon English vocabulary, when the materials and methods were adapted toward increasing a knowledge of English derivatives.[16] In each of five schools participating in the study parallel groups were chosen, containing pupils of approximately equal ability as follows:

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[14] H. R. Douglass and C. Kittelson, "The Transfer of Training in High School Latin to English Grammar, Spelling and Vocabulary," *Journal of Experimental Education*, Vol. 4 (1935), pp. 26-33.

[15] Frederick L. Pond, "Influence of the Study of Latin on Word Knowledge," *School Review*, Vol. 46 (1938), pp. 611-618.

[16] A. A. Hamblen, *An Investigation to Determine the Extent to Which the Effect of the Study of Latin Upon a Knowledge of English Derivatives can be Increased by Conscious Adaptation of Content and Methods to The Attainment of This Objective*. Ph.D. Thesis (University of Pennsylvania, 1925).

1. A group of pupils in beginning Latin in which no efforts was made to teach English derivatives.
2. A group of pupils in beginning Latin in which a study of derivatives was given regularly as part of the course.

The *Thorndike Test of Word Knowledge* and *The Carr English Vocabulary Test* were given at the beginning, middle, and end of the experiment. The Carr test consists of 50 fairly difficult words, half of which are of Latin origin and the other half of non-Latin origin. This made it possible to compare the transfer value of Latin to English Vocabulary of Latin and non-Latin origins. The year gains of the experimental and control groups on the two tests are shown in Table 16-6.

TABLE 16-6. *The year gains of the control and experimental Latin groups on English vocabulary*

	CARR TEST			THORNDIKE TEST
	LATIN WORDS	NON-LATIN WORDS	TOTAL	
Control	4.05	2.77	6.82	6.74
Experimental	8.12	3.49	11.61	10.66

A comparison of the year gains by the control and experimental groups shows that the superior gains on the Carr test are almost entirely due to gains made in Latin-derived words. A further element in this study indicated that greater gains were made in those schools were the textbooks made favorable conditions for derivation than from those schools where the textbooks made no provision. The results of this study revealed that the school with the most favorable conditions of textbooks, and method of instruction made a year gain on Latin-derived words four times as great as that made by the school with the least favorable conditions.

A second study conducted as part of the American Classical League investigation, attempted to determine if equally good results could be obtained by students studying English without Latin.[17] The group studying Latin with special emphasis upon derivations showed significantly greater gains.

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[17] R. I. Haskell, *A Statistical Study of the Comparative Results Produced by Teaching Derivations in the Ninth Grade Latin Classes and in the Ninth Grade English Classes of Non-Latin Pupils in Four Philadelphia High Schools*. Ph.D. Thesis (University of Pennsylvania, 1923).

Tests of different aspects of ability in mathematics have shown that computational skill is only slightly related to ability to deal with quantitative relationships. There is evidence, however, that the method of learning will significantly affect the amount of transfer. In one case, four groups of 112 second-grade pupils practiced simple addition.[18] The first group, the demonstration group, was merely shown how to do such additions. The second group, the generalization group, was given help in formulating general methods of attack. The third group, the rationalization group, was given the reasons and principles involved in the exercises. The fourth group, was a combination generalization and rationalization group. The results of this study, summarized in Table 16-7, show a significantly greater superiority of the generalization group over the other groups. The demonstration group yielded the smallest amount of transfer. The results of this study have been verified by other studies. Anderson, using fourth-grade children as subjects, compared the results of learning arithmetic by meaningful methods with those obtained from a more mechanical procedure.[19] No significant differences between the two groups were found in computational ability; however the instructional method which emphasized understanding produced superior results on tests involving quantitative thinking, especially when such problems were different in some specific phase from those included in the instructional materials.

TABLE 16-7. *Percentage of transfer produced by each of four methods of instruction in the addition of two-place numbers to addition examples with a different number of digits*

METHOD	PER CENT OF TRANSFER	INCREASE OVER DEMONSTRATION
Demonstration	46.6	
Generalization	67.6	45.1
Rationalization	53.8	15.5
Generalization and rationalization ..	63.8	36.9

Many exorbitant claims have been made for the value of the study of science. An early study bearing on this was conducted by a botany teacher.[20] The students' ability to observe was first measured. They were then trained in observing botanical materials. Following this period of training a second test of observation was administered. There was a considerable gain made by the students in their ability to observe botanical materials; but little gain was found for observing nonbotanical materials. One of the claims of science is that of developing scientific attitudes in pupils. There is evidence that where special efforts are directed toward the avoidance of superstitions, hasty inferences, and prejudices statistically significant changes do occur. One experiment showed that a course in psychology produced a decrease in belief in certain misconceptions.[21]

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[18] J. R. Overman, "An Experimental Study of the Effect of the Method of Instruction in Transfer of Training in Arithmetic," *Elementary School Journal*, Vol. 31 (1930), pp. 183-190. By permission of The University of Chicago Press.

[19] G. L. Anderson, "A Comparison of the Outcomes of Instruction Under Two Theories of Learning," Ph.D. Thesis (University of Minnesota, 1941).

[20] H. O. Rugg, *Experimental Determination of Mental Discipline in School Studies* (Educational Psychology Monographs, 1916), No. 17.

A study by Mudge was designed to see if a year's training in high-school chemistry would increase a student's ability to (a) apply chemical information to the solution of problems of everyday life, and (b) to read intelligently popular scientific literature.[22] The findings from this study showed that students who studied chemistry in high school for one year made significant measurable gains in knowledge of chemistry. These gains were accompanied by significant but smaller gains in the ability to apply this knowledge to the solution of everyday problems and in interpreting popular scientific literature. A significant measurable amount of knowledge of chemistry still existed following a lapse of from one to four years after taking a course in chemistry in high school. However, the students did not show a significant amount of functional knowledge after this lapse of time.

THEORETICAL EXPLANATIONS OF TRANSFER

It has already been pointed out that formal discipline of certain subjects was offered by the early educators as the basis of transfer. This notion has gradually been discarded, as a result of the avalanche of experimental evidence which did not support it. And, although the notion that transfer may and does take place is recognized by practically all, they are not in agreement as to just how it occurs. The explanation of how transfer takes place is an issue which has brought forth a number of theories.

Theory of identical elements. Most of the experiments of transfer have shown that improvement in one task affects one's performance of another task. However, in some cases the effects are harmful rather than beneficial. In such a case negative transfer is said to occur. Thorndike early noted that a change in one function affected another in so far as the two functions had as factors *identical elements*.[23] As the similarity decreased there was usually a falling off in the amount of transfer. The amount of transfer would, according to this theory, increase in proportion to the number of identical elements contained in both situations.

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[21] J. W. McGarvey, "Transfer of Learning in Elementary Psychology (1) to Popular Misconceptions, and (2) to Social Science Courses," *Psychological Bulletin*, Vol. 34 (1937), pp. 704.

[22] Evelyn L. Mudge, *Transfer of Training in Chemistry* (Johns Hopkins University, Studies in Education, No. 26), 1939.

An example of transfer of training based upon identical elements would be the effect of learning to spell orally upon the ability to spell the same words in written form. There is in this case an identity in the ability to place the letters of the words in correct order, but the nature of the responses are different. The cues on which the subject depends are common to the two kinds of responses. An early study of transfer from Latin conducted by Thorndike and Ruger.[24] illustrates the relation of identical elements to transfer. After administering to Latin and non-Latin students in forty-one schools an English vocabulary test at both the beginning and end of the control period they concluded that significantly greater improvement was made by Latin students over non-Latin students on words of Latin derivation. There was no significant difference between the two groups in improvement on non-Latin derivatives.

When the learning situation and the one to which the learning is expected to transfer are the same, as in the case of addition at school and the addition of similar problems at home, the process should be regarded as learning rather than transfer. In such a case there is an identity of materials and also an identity of types of problems to which the learner reacts. This would be the most effective type of transfer, if it could be provided for in learning situations. For example, Miller reports that pilots who received at least part of their training on two-engine planes showed more skill in piloting advanced two-engines planes than did those who received all their training on one-engine planes.[25] Needless to say, the various situations and problems in life cannot be foreseen; therefore learning tasks and teaching procedures should be chosen so as to yield the maximum transfer.

Identical components and the social utility movement. The breakdown of the theory of formal discipline and the projection of the theory of identical elements furnished the basis for the social-utility movement. In education. If the amount of transfer is dependent upon the presence of common factors, it is imperative for the school to make its activities as nearly as possible like that which will actually appear in life outside the school. The social-utility movement turned the attention of the school to the real and significant concerns of human living, and away from fantastic, improbable, and unreal problems and understandings. This movement emphasized that transfer of methods of attack, of knowledge and understanding, methods of learning and problem-solving, interests, attitudes, and ideals to situations of everyday life will be greater to the extent that subject matter and activities of the classroom are similar to those encountered in daily living.

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[23] E. L. Thorndike, *Educational Psychology*, Briefer Course (New York: Teachers College, Columbia University, 1914), p. 268.

[24] E. L. Thorndike and G. J. Ruger, "The Effect of First-year Latin upon Knowledge of English Words of Latin Derivation," *School and Society*, Vol. 18 (1923), pp. 260-270.

[25] N. E. Miller, "Psychological Research on Pilot Training," *Army Air Force Aviation Psychological Program Research Report* (U.S. Government Printing Office, 1947), No. 8.

The theory of identical components did not confine transfer to highly detailed parts, or to extremely narrow common items.[26] The theory of identical components, while denying that target practice would improve one's power of concentration, temperament, or observation, would affirm that certain methods, skills, and attitudes learned in the course of the target practice would carry over to another activity to the extent that the two activities and the total situation have important characteristics in common. What, then, are some kinds of responses, according to this theory, that may transfer? The method of keeping the eye carefully focussed upon the target in practice may carry over to hitting a baseball or even catching a ball. Also, the development of a reasonable amount of assurance and confidence may carry over into another activity.

What is carried over, from the viewpoint of identical components, is not an improved memory faculty, or power of reasoning, but methods of attack, ideas, and attitudes which may be beneficial or harmful to the performance of another act. Previous knowledge in algebra may provide cues to the solution of other problems. Historical information may make the reading of certain pieces of literature more meaningful.

A study by Gagné and Foster, bearing on this, was designed to determine the influence of practice of certain subordinate activities of a complex skill upon the learning of the total skill.[27] Different amounts of training were given to separate groups of subjects on an initial task which was a part of a total skill involving four different manual reactions. Following the initial practice each group learned the total skill to a high degree of efficiency. The degree to which different amounts of practice on the subordinate parts contribute to the learning of the total skill is shown in Figure 16-1. These data show that there is a definite transfer from the subordinate to the total performance. However, it is evident that the most efficient method of training for any given level of proficiency, in terms of number of trials to learn, is that which begins with the total motor skill without preliminary practice on the subordinate parts.

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[26] R. S. Woodworth, *Experimental Psychology* (New York: Henry Holt and Co., 1938), p. 177.

[27] R. M. Gagné and H. Foster, "Transfer of Training from Practice on Components in a Motor Skill," *Journal of Experimental Psychology*, Vol. 32, (1949), pp. 47-68. Fig. 16-1 is reproduced by permission of the Journal and the American Psychological Association.

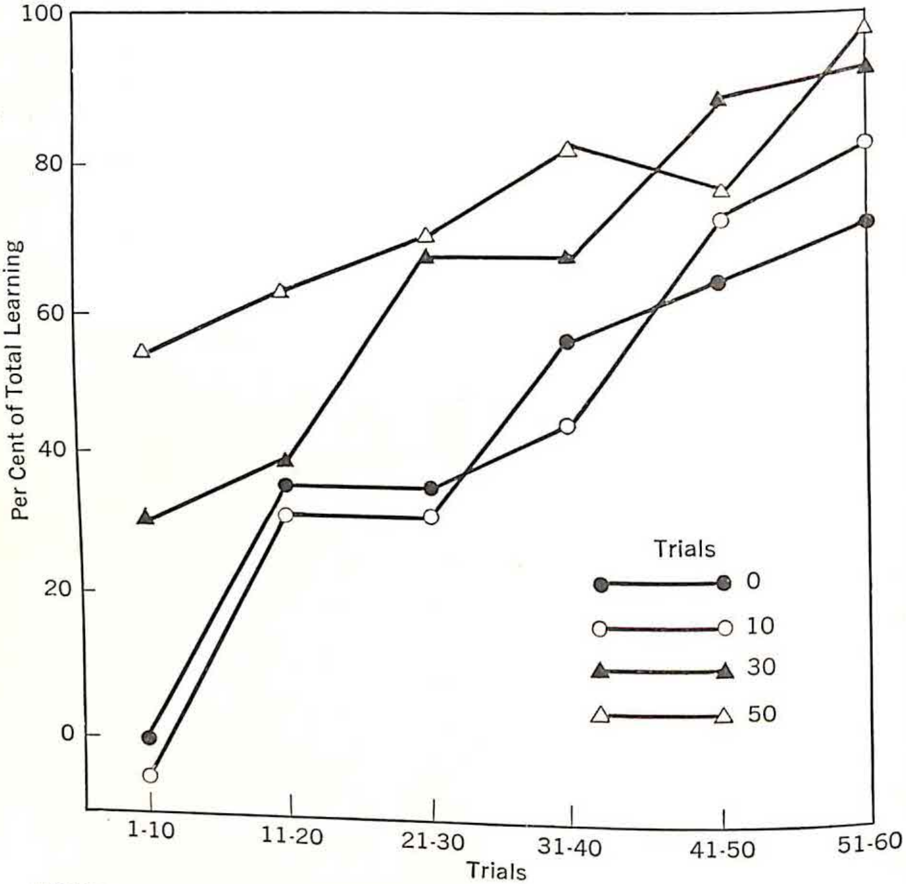

FIGURE 16-1. Per cent of learning accomplished by each of four groups with different numbers of preliminary training trials and six stages of practice on the final task

Theory of generalization. The theory of generalization was early projected by Judd as an explanation of transfer. In his experiment two groups of boys were given practice in shooting at a target beneath the water.[28] In one situation the target was submerged 12 inches under the water, while in the second situation it was placed 4 inches under the water. One group was taught the theory of refraction of light while the other group was given no such explanation. When the depth of the target was changed the group which had been taught the theory of refraction of light showed a significant superiority over the other group. Judd explained this superiority of the instructed group over that of the uninstructed group as a result of applying a principle learned in one situation to the performance of a task in a different situation. Thus, he places emphasis upon human intelligence which enables an individual to understand and apply to specific situations principles and meanings acquired in previous situations.

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[28] C. H. Judd, "The Relation of Special Training to General Intelligence," *Educational Review*, Vol. 36 (1908), pp. 36-37.

The theory of generalization has received support from many experiments. An experiment by Swenson was concerned with this problem.[29] Three groups of second-grade children learned 100 addition facts by three different methods:

> In method "D" the addition facts were arranged in order of difficulty and repetitive drill was the principal procedure followed.
>
> In method "X" the addition facts were grouped by the size of the sum (all combinations with the sum of 8 were grouped together, etc.), and the children were allowed to verify the newly presented fact prior to the drill process.
>
> In method "G" the addition facts were grouped by generalizations, and the children were guided in discovering the generalizations rather than having them given to them self-made.

Tests were administered to the groups at intervals during the period of the experiment and at the end of it. These tests included addition facts not taught, more complex addition problems, and subtraction facts. The results of these tests showed transfer in the case of all three groups; however the group in which the addition facts were grouped by generalizations registered the greatest gain, while the drill group "D" showed the least. A tendency was noted for retroactive inhibition.[30] to occur more frequently and in greater amount among the children taught by the drill method than among those who were guided in formulating generalizations.

Patterns of experience. Several theories of transfer have emphasized patterns of experiences. One of the best known of these is the Gestalt theory, set forth by Max Wertheimer in 1912. According to this theory to learn is to form or complete a Gestalt—a pattern or configuration which has meaning. The learner, according to this viewpoint, responds as a unified and integrated organism to a total stimulus—a pattern or configuration. Transfer according to this theory emphasizes the necessity for the learner to recognize significant elements in these patterns.

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[29] E. Swenson, "Generalization as a Factor in Transfer and Retroactive Inhibition." Ph.D. Thesis (University of Minnesota, 1941).

[30] Retroactive inhibition is a sort of interference with the retention of previously learned materials as a result of interspersed experiences or learning.

The word *transposition* has been used by Gestalt psychlogists. In the case of poetry a particular rhythm is the same rhythm, even though the lines are different in length, and have no words in common. There is a similarity between the transposition theory and the theory of identical elements. The difference in the theories lies in the basis of equivalence. Since this theory, like that of generalization, emphasizes the importance of generalizing or carrying over ideas and principles from an old experience to a new pattern, it may be regarded as a theory which emphasizes generalizations involving patterns.

There are a number of studies which indicate that the learner must recognize these common elements found in the new situation if transfer is to occur. Maier has suggested that when previous experiences help one in solving a new problem, it is because the problem contains an element of relationship to which the person has previously reacted.[31] Thus, while transfer of training involves identical elements, identity alone is insufficient. The individual must recognize, as a result of memory or meanings established, the identity. It is at this point that the theory of identical elements, referred to in connection with early studies by Thorndike, and the theory of generalization, referred to in connection with studies by Judd, tend to fuse into a unitary theory based upon *subjectively observed identical elements*. The form of awareness which reflects these functional relations may also be called *patterns of experience*.

Transfer and intelligence. Studies of the generalization ability of children show that bright children generalize better than dull ones.[32] This ability to see relationships, which are involved in generalizations, is an important characteristic of intelligence. Thus, it is most likely that a study of certain subjects such as Latin, even when taught by the grammar-translation method, will yield considerable transfer to English vocabulary for bright students, while there will be a negligible transfer for the average student.

The results of Thorndike's studies of the relationship between the study of particular high-school subjects and improvement on intelligence tests substantiate this fact. He found that the average gain for the superior students was about 20 points, while the average gain for the inferior student was 1.5 points. This finding has been supported by results from a

[31] Norman R. F. Maier, "Reasoning in Human III: The mechanism of Equivalent Stimuli in Reasoning," *Journal of Experimental Psychology*, Vol. 35 (1945), pp. 349-360.

[32] Herbert A. Carroll. *Generalization of Bright and Dull Children* (Teachers College, Columbia University, Contributions to Education, 1930), No. 439.

Portland (Oregon) Public Schools

Favorable attitudes and interests are promoted through meaningful and stimulating experiences

number of related experiments. Ulmer's study of the transfer value of geometry to reflective thinking revealed that there was a positive transfer for those students with an IQ in excess of 120, even though no conscious effort was made to relate the geometry materials encountered to principles of reflective thinking.[33]

POSITIVE TRANSFER IN SCHOOL LEARNING

Transfer of training is a problem of major concern to the educational psychologist. One does not have to look far to see why this is one of the most important problems of the entire educational program. Educators have throughout the ages assumed transfer. This is but natural, for there is little value to be found in the learnings at school if they will not transfer to out-of-school situations. There is also the educational problem, faced by the classroom teacher, of the nature and extent of transfer within the

[33] G. Ulmer, *op. cit.*

school program. The question may be raised then as to how the findings from the research studies may be used in educational practice. In the following discussion it will be pointed out that these findings are important in connection with (a) the selection and organization of the curriculum, (b) methods of teaching, and (c) individual guidance.

Transfer and the curriculum. Early studies of transfer resulted in a number of changes in the school curriculum. However, some of these changes were not justified by the findings of these studies, while others were not necessarily in harmony with the goals of education. The traditional school curiculum still stresses the disciplinarian value attained from the mastery of a body of subject matter. Many educators have within recent years attempted to organize the school curriculum around the experiences and problems of pupils. It should be recognized, however, that it would be impossible to organize curiculum materials around all the problems that pupils are apt to meet in their future activities. Thus, the educator is faced with the task of providing learning experiences which will carry-over into out-of-school activities.

The lack of transfer from knowledge of good citizenship to practice may be noted among the juvenile delinquents—products of our schools. We have operated on a false doctrine closely akin to formal discipline which asserts that "knowledge is power." Knowledge becomes power to the extent that (1) the person is able to generalize from his knowledge to everyday activities and problems, and (2) the individual is motivated to use the knowledge for the attainment of certain desired ends.

The curriculum should be conceived of as a means rather than end. If the materials learned are to be of value to the learner they must be of such a nature that the knowledge, skills, habits, and attitudes acquired will transfer to out-of-school situations. It has long been recognized that the amount of transfer from one learning situation to another will depend in a large measure upon the similarity of the learning tasks. The curriculum content should be closely related to the interests, needs, and aspirations of the learner and the framework of the society of which he is a part.

Transfer and teaching methods. Although some transfer may be expected to occur in most learning; the teacher must not assume that it is automatic. If the maximum amount of transfer is to occur the efforts of the teacher must be directed toward this as a goal. The goals of the teacher are most important in determining the nature and amount of transfer. This may be noted in the results of experiments already referred to in which there were different goals present. If the major goal of history is the acquisition of historical facts, the teacher will most likely teach and test for such factual information. The results will likely be transfer of information to somewhat similar materials. However, if the problem approach is used, one might well expect transfer to the solution of somewhat similar problem situations. Again, if an understanding of civic responsibility is stressed, transfer will most likely occur in out-of-school behavior. The maximum transfer will occur in either case, however, when the learner's attention is directed so that he is able to see the relationship between the experiences in the classroom and those out-of-school. Meanings, understandings, applications, and worthwhile attitudes should be aspects of the goals of all teaching.

The question may be raised: If we teach subject-matter for the purpose of helping individuals to meet life problems better, then why not use the subject-matter of the specific problems students will meet? The answer to this question lies in the nature of learning and transfer. In the first place, subject-matter is not taught to help students with any one problem alone. Chemistry is not taught simply to help students mix certain ingredients so as to produce a special solution to protect zinnias against mildew. Chemistry, when taught in terms of the applications of the facts and principles to a wide variety of situations can be very fruitful and yield considerable transfer; but when taught in a conventional manner for the purpose of acquiring many facts so as to pass an examination it will likely have little meaning, show little retention, and yield no significant transfer. In the second place, when a subject is taught so as to provide for transfer, one can expect the materials to be more readily learned and retained. Increased transfer results from good learning procedures.

In the final analysis, the solution to the problem of transfer rests with the teacher. This notion has been well stated in the following statement:

> Do we want transfer, and if so, what, in terms of ideals, attitudes, beliefs and habits, do we want transferred; and what provision should we make in method of learning and teaching, administration and the like, in order to bring about transfer in the form and amount we desire? . . . First, the teacher should know what it is that she wants the children to transfer to other fields, second, she must learn by experience or experiment how to teach for transfer, and third, to go ahead and do it.[34]

Transfer and the learner. The importance of the individual learner in connection with transfer of training should not be overlooked. Just as individual activity and effort are essential for learning, so must conscious direction be present if there is to be transfer. Transfer is not automatic, even when materials and methods are carefully chosen. It has been amply demonstrated that the attitude of the learner toward the use or application of previously learned materials has an important influence upon transfer. In one instance, two groups of students were used in each of three studies of this problem.[35] In each study one group was given special instructions for learning the new materials, while the other group was given no such instruction. In one case the experimental group was instructed to use the method of study they had acquired during earlier learning; in a second case the experimental group was instructed to use their knowledge of Latin in determining the meaning of the words of the test; while in the third case the experimental group was instructed to make use of knowledge acquired in descriptive geometry. In the three cases the instructed groups showed a significant superiority over the noninstructed group in the amount of transfer. The result of this study lends support to the importance of generalization on the part of the learner as a basis for transfer.

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[34] Pedro T. Orata, "Transfer of Training and Educational Pseudo-science," *The Mathematics Teacher*, Vol. 5 (1935), pp. 278-281.

SUMMARY AND EDUCATIONAL IMPLICATIONS

Transfer is the inevitable and legitimate hope and assumption in all learning. The problem of transfer is a fundamental one in the selection of curricula materials, teaching procedures, and educational goals. The modern school is very much concerned with the problem of transfer. That transfer is not automatic is an accepted axiom in education. The modern school attempts to provide students with learning experiences that are meaningful in nature and will lead to the maximum transfer to out-of-school situations.

The theories of *identical elements* and *generalization* have received the most attention by those who attempt to explain the process of transfer. In actuality these theories appear to offer descriptions of the avenues of transfer. The theory of identical elements emphasizes the similarity of materials. The generally accepted rule here is that in order to obtain a large amount of transfer it is essential for the two learning situations to have a number of common elements. Experimental studies have shown that such a description of the transfer process is over-simplified. Other factors which must be taken into consideration are: (1) the intelligence of the learner; (2) the attitude of the learner toward the learning materials; (3) the learning situation; (4) the awareness of the learner of the identical components; and (5) the habits of study and learning which the learner has acquired.

The theory of generalization maintains that transfer takes place to the extent that the learner generalizes his experiences. This theory emphasizes the importance of the learner rather than content or materials in the transfer process. The importance of the teacher in the promotion of transfer is also emphasized in this theory. The teacher who follows sound learning principles in the guidance and stimulation of the pupils will secure the maximum of transfer. One must not fall into the error of looking upon generalization as a magic wand which the teacher introduces into the learning situation and produces transfer. Generalizations must be within the range of the learner's experiences. The learner must furthermore be able to comprehend the common elements or pattern in the new situation. The learner's attitude toward the situation, and the degree of mastery of the material learned will have an important effect upon the amount of transfer. In this connection the teacher should realize that transfer is not automatic, but must be a goal of both the teacher and learner if the maximum effects are to be secured.

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[35] M. F. Dorsey and L. T. Hopkins, "The Influence of Attitudes upon Transfer," *Journal of Educational Psychology*, Vol. 21 (1930), pp. 410-417.

Questions and Exercises

1. Give an illustration to show how you would set up an experiment to test the transfer value of algebra to critical thinking. What are some elements you would try to control?
2. What were the major findings of early experiments on transfer of training? What criticisms have been offered of these studies?
3. How is intelligence related to transfer? What bearing does this have on the school program for bright children? Upon the guidance program in general?
4. Contrast *formal discipline* and *transfer of training.*
5. Show how good learning principles, introduced in earlier chapters, will yield increased transfer.
6. Would studying a subject, such as political science, in order to pass an objective subject-matter test likely have significant transfer value to the development of a better understanding of the purpose and function of government? Give reasons for your answer.
7. Consider one of the best teachers you have had during the course of the past two or three years. Were the methods of that teacher of such a nature that good transfer would occur to problems of everyday life? Cite illustrations to substantiate your answer.
8. How would you account for the conflicting results of experiments on the transfer value of Latin?
9. Contrast the *theory of identical elements* and the *theory of generalization.* Show how the two tend to operate together producing transfer.

Recommended Readings

Cronbach, Lee J., *Educational Psychology* (New York: Harcourt, Brace and Co., 1954), Chap. IX.

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: The Macmillan Co., 1948), Chap. XV.

Hilgard, E. R., *Theories of Learning* (New York: Appleton-Century-Crofts, Inc.), 1948.

Jordan, A. M., *Educational Psychology*, 3rd ed. (New York: Henry Holt, 1942), Chaps. VI and VII.

McGeoch, J. A., and Irion, Arthur L., *The Psychology of Human Learning*. 2nd ed. (New York: Longmans, Green and Co., 1952), Chap. IX.

Mursell, James L., *Psychology for Modern Education* (New York: W. W. Norton and Co., 1952), Chap. X.

Pressey, Sidney L., and Robinson, Francis P., *Psychology and the New Education* (New York: Harper and Bros., 1944), Chaps. XVII and XVIII.

Sorenson, Herbert, *Psychology in Education,* 2nd ed. (New York: McGraw-Hill Book Co., 1948), Chap. XVII.

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951), pp. 455-469.

Witherington, H. Carl, *Educational Psychology,* rev. ed. (New York: Ginn and Co., 1952), Chap. XVI.

CHAPTER 17

Measuring the Results of Learning

THE TASK of the teacher has been defined in previous chapters in terms of guiding and stimulating the growth and learning of individuals. If the teacher is to guide the learner toward the successful development of desirable knowledges, skills, attitudes and values, and desirable personal and social adjustments he must be able to evaluate objectively and as accurately as possible his (1) physical and motor development, (2) mental abilities and special aptitudes, (3) emotional and social needs, (4) interests and attitudes, (5) the degree of mastery of the tools of learning, (6) the degree of learning subject-matter content in certain academic areas, and (7) the ability of the student to solve problems involving critical thinking. Some of these aspects of measurement were presented in previous chapters. It is the special province of this chapter to present useful data based upon research studies about the development and use of achievement tests for the modern school program.

The instructional program may be conceived of as involving four basic steps: (1) objectives, (2) content, (3) organization, and (4) evaluation. Studies in educational psychology have within the past several decades furnished much useful information about the evaluation of the growth and learning of pupils as an aspect of the total instructional program.

THE FUNCTION OF MEASUREMENTS

Historical perspective. The first effective step toward modern testing practices was undertaken by Rice in 1894, although the history of education reveals that examinations have always played an important role in American schools. Impressed by his experiences in Germany, Rice prepared a spelling test, which was given to pupils in different communities in an effort to determine the relative effectiveness of different methods used in teaching spelling.[1] He reported the results of his study, and met considerable opposition to his efforts to measure achievement in a precise manner. However, these early efforts were instrumental in stimulating additional studies.

Through the efforts of Thorndike and his students new measuring devices were developed. In 1909 Thorndike presented a paper in which he proposed to measure the quality of handwriting by means of a handwriting scale. This instrument consisted of a series of samples scientifically chosen and placed on a chart in order of merit, such as that shown in Figure 17-7.[2]

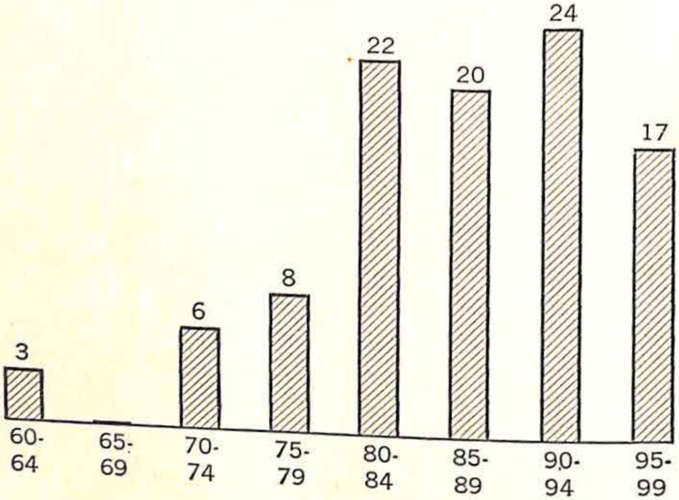

FIGURE 17-1. Percentage marks given to an English composition by 100 teachers

Following the pattern of the *Army Alpha Intelligence Test* (See Chapter 5), objective tests of learning in various school subjects were developed. Along with the development of objective tests came the development of essential collateral-statistical techniques. Under the leadership of Ayres, Thorndike, Holzinger, Garrett, and others, methods of calculating standard scores, reliability, and validity coefficients and sampling indices were developed. Not only were new type objective tests developed, but also the methods for their interpretation were scientific.

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[1] See J. M. Rice, "Futility of the Spelling Grind," *Forum*, Vol. 23 (1897).

[2] Thorndike's first scale and an account of the construction of it is presented in an article by E. L. Thorndike, "Handwriting," *Teachers' College Record*, Vol. 11 (1910), pp. 1-93.

The measurement movement was given additional impetus by various studies revealing the inaccuracy of teachers' judgments, when applied to grading traditional tests. One study dealt with agreement of 100 teachers on the worth of a single composition in English.[3] The grade range was from 60 to 99 with a median grade of 88. The distribution of these grades is shown in Figure 17-1. There is obviously a lack of agreement among these teachers concerning the grade that should be given this composition. Brown reports that 12 home-economics teachers disagreed in grading essay test papers in their subject from a minimum difference of 18 percentage points on one paper to 61 points on another.[4] The range of these disagreements is shown in Figure 17-2. It should be pointed out, however, that recent studies show that the differences in subjective judgments can be considerably reduced by setting up standards in advance and giving people training in evaluating papers based upon such standards.

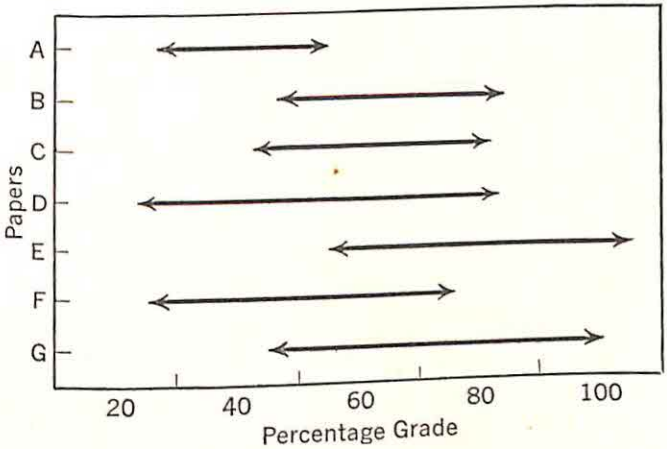

FIGURE 17-2. Range of percentage grades given to seven essay examination papers in home economics by twelve teachers in home economics

During the past decade or more many tests have been developed to measure attitudes, interests, critical thinking ability, personal-social adaptability, and the like. Thus, the methods and scope of tests and measurements have been extended and the term *evaluation* has been introduced.

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[3] J. D. Falls, "Research in Secondary Education," *Kentucky School Journal*, Vol. 6 (1928), pp. 42-46.

[4] C. M. Brown, *Evaluation and Investigation in Home Economics* (New York: F. S. Crofts, Inc., 1941).

This term is also used in connection with methods of collecting data on child growth and development other than those usually referred to as tests. Many of the findings reported in the earlier chapters dealing with growth and development were secured from a use of a variety of evaluative instruments and devices.

Purpose of evaluation. A complete test program will comprise (1) the day-to-day evaluation by the teacher of many aspects of pupil growth and learning; (2) periodic evaluations by the teacher of growth and learning specific skills, knowledges, and understandings; and (3) general surveys administered uniformly throughout the school system. The teacher is the person who is in the best position to do the first two, although he may need the assistance of a test specialist in the development and improvement of techniques for measuring some of the more intangible outcomes.

Concerning the purpose of evaluation in the high-school program Glenwood Walker has recently stated:

> The ultimate purpose of evaluation in the modern secondary school, however, is to assist the teacher, school, and community in providing each student with the best possible guidance, based on an accurate, objective, and usable portrait of the "whole" student.[5]

Limitations of paper-and-pencil tests. The traditional school depends almost exclusively upon paper-and-pencil tests for appraising the educational growth of the pupils. When the goals of the school are considered in terms of desired changes in pupil behavior, it becomes obvious that many worthwhile changes cannot readily be measured by means of paper-and-pencil tests. For example, it appears unlikely that paper-and-pencil tests will adequately measure the extent to which a student applies what is learned in an art class to his personal living. However, this is an important objective of a modern art course in high school. In evaluating the growth of the student in the attainment of this objective, paper-and-pencil tests may reveal that the student is able to give the desired definitions, to discriminate between good and poor design, and give accurate information about certain products of art, but unless his behavior changes so that he makes better artistic choices in his daily living, the objective set forth has not been fulfilled.

Other evaluative techniques have been developed for appraising certain desirable school outcomes which are not adequately or correctly appraised by paper-and-pencil tests.[6] Rating scales, direct observations, check lists, anecdotal records, inventories and questionnaires, sociometric data, etc., have been found useful in gathering these data, and should be a part of a complete measurement and evaluation program.

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[5] A. Glenwood Walker, "Role of Evaluation in Secondary Education," *California Journal of Secondary Education*, Vol. 28 (1953), pp. 65-67.

ESSENTIAL OF A GOOD MEASURING INSTRUMENT

Many instruments and techniques have been developed for measuring growth and learning. Some of these have very limited value, since they give only a partial estimate of the learner's true performance; others furnish an evaluation of aspects of learning that are not closely related to sound educational objectives; while others may be too inaccurate for making sound judgments about the performance of the learner. Because learning is so varied and educational objectives are so diverse, methods of measurement in the field of education are many varied. An effective method of measurement in one field may not be effective in another. Learning to spell cannot be measured in the same manner as learning the causes of the Civil War, or the development of literature appreciation. The method of measurement must be governed by the nature of what is measured.

Objective vs. subjective tests. The forms of educational measurement may be classified into two major types—objective and subjective. Although a careful analysis of the nature of tests reveals that these terms are somewhat relative rather than absolute. A subjective test is one in which the correct or good answer is determined by the judgment of the teacher, or the one scoring the test. The objective test is one in which the right or correct answer is determined by its agreement with a key or model answer. The scorer's judgment does not affect the score a pupil makes on an objective test. If two teachers grade the same subjective test, they may give it different values or scores, depending on their own judgments about the values of certain answers. If two teachers grade the same objective test, they should both give it the same values or scores, providing the same key is used in scoring the test.

Any attempt to classify tests as completely objective or completely subjective meets with much difficulty. These are relative terms, with certain tests quite objective in nature while others are quite subjective. It should be recalled that human judgments are involved in the construction of test items, the determination of the correct answer for each item, and the weight to be given each item. Needless to say, some test items are more readily verifiable than others. However, to limit tests to items that are completely verifiable by factual data would tend to reduce measurement and evaluation to a testing for basic facts alone.

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[6] Some of these are described quite freely in recent textbooks on measurements and evaluation in education.

Validity. The most important feature of any test is its validity or truthfulness. The question with which validity is concerned may be stated as: Does the test actually measure that which it purports to measure? Needless to say, unless a test of reading comprehension or health actually measures that which it is designed to measure the results are misleading. In the final analysis, validity has a subjective reference which no definitions, however precise, can wholly erase. One cannot say with certainty that any measure is actually measuring the trait that it is intended to measure. The standards and criteria by which the validity of a test is to be checked have in themselves certain inherent subjective features. The best basis for judging the validity of a measuring device is that of comparing the results obtained from such a test with those obtained from other well-known and generally accepted tests of the particular thing or trait being tested.

Accuracy and reliability. Obtaining accurate information about a pupil's achievement in science encounters the same problems as obtaining accurate information about his height and weight. However, the task is made more difficult because of a number of factors, such as (1) the more intangible nature of the materials being measured; (2) the greater variability of the individual's possible responses; (3) the nature of the measuring instrument; and (4) the difficulty involved in accurately scoring the learner's responses.

Reliability refers to the agreement found when a student repeats a test or another form of a test. A test is said to be reliable when the results of the second testing tend to agree with the results of the first testing. This is a measure of dependability, and a test that is not dependable cannot be a valid measure.

Usefulness. It should go without saying that a testing program without a purpose or goal is well-nigh useless. Furthermore, unless some use can be made of test results, the effort and time expended cannot be justified. There are a variety of uses made of tests and test results, some of these may be listed as follows:

1. To evaluate the achievement or educational growth of pupils.
2. To evaluate the effectiveness of teaching, or some specific teaching procedure.
3. To evaluate the appropriateness of certain curricular materials.
4. To determine the weaknesses of individual pupils.
5. To predict future achievement.
6. To compare the achievement of the group with that of other groups.

TEACHER-MADE TESTS

It appears that the well-trained teacher is in the best position for the development of measuring instruments for evaluating the growth and learning of the pupils, especially the educational achievement of his pupils. The so-called expert in test construction is all too often not intimately related with the total educational program. The teacher is the one person who is in the best position to follow through the four basic but intimately related steps in the instructional program, referred to earlier in this chapter.

Principles for constructing tests. Sometimes teachers want to test their pupils' learning of units of subject matter as they are completed. Even with the terminal use of teacher-made tests or standard tests, it is necessary for teachers to construct and make use of tests periodically. A poorly constructed test may prove itself almost useless. Teachers who construct their own test should learn to follow certain sound principles of test construction. A poor test may be worse than no test. The following rules should be carefully considered in the construction of tests:

1. *Educational goals must be clear and definite.* What is the course for? What is the teacher trying to accomplish? Is one of the goals to teach children certain facts? Is another goal to teach children how to use those facts? The following list of goals for a course in practical mathematics illustrate the meaning of this principle.

   GOALS FOR A COURSE IN PRACTICAL MATHEMATICS

   a. To learn how to recognize and reduce to quantitative terms certain aspects of daily life.
   b. To learn how to calculate the quantitative advantages and disadvantages of installment buying.
   c. To learn how to make budgets and keep records.
   d. To learn how to construct and interpret tables and graphs.
   e. To learn how to calculate the costs and returns from various forms of insurance.
   f. To learn how to calculate the effects of periods of prosperity and depression on the values of money and property.

Goals such as these are guides to classroom activity. Often they are taken care of in a good textbook so that the teacher's goal may be simplified to that of merely teaching the content of the textbook. Whatever it is, both the teaching and testing techniques should be directed toward these goals.

2. *Tests should be constructed in harmony with the goals of the course.* Both pupils and teachers should understand the goals of the course and should

be intimately involved in evaluating progress toward the attainment of the goals.

3. *Questions and exercises should be clearly stated.* In other words, the test items should not be ambiguous. The meanings should be clear, so that the pupils understand what is expected of them. Suggestions relative to objective short-form tests will be given later in this chapter.
4. *Test items should be selected representing a wide range of difficulties.* This will enable the poorer student to complete some of the exercises, while the superior student is challenged by the difficult items.
5. *The test items should be selected and presented in a form so that they may be graded with a reasonable degree of objectivity.* Misinterpretation, lack of understanding, and complete subjectivity in judgment on the part of the scorer are foes to test reliability.
6. *Tests should be as long as is consistent with the time available for testing.* Other things being equal, the reliability of a test depends on its length. The score on a long test is more likely to be accurate than the score on a short test.

It has been noted that some students prefer one type of test, while others prefer another. Furthermore, some types of tests challenge students to their best efforts more than others. Silvey found that college students desired to be told of the types of test that was to be given, with the majority of them preferring the short-form objective test.[7] The results from a number of questions directed to a group of college students are presented in Table 17-1.

Essay tests. While the short-form test items have been used for measuring many aspects of achievement, they should not completely replace the essay or discussion exercises. Verner Sims has offered some constructive suggestions relating to the kind of outcomes which can appropriately be measured by the essay type of test.[8]

1. The essay examination appears to be particularly well suited for obtaining evidence relating to certain "higher-order" intellectual outcomes of education. Although essay tests are most often used for testing the amount of information acquired by a pupil, they require the pupil to organize this information, and may be used to relate such information to various problems or conditions . . . .
2. Inferences concerning certain personal-social learning are perhaps best drawn from the kind of data obtained through essay questions. . . . The

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[7] H. M. Silvey, "Student Reaction to the Object and Essay Test," *School and Society*, Vol. 73 (1951), pp. 377-378.

[8] Verner M. Sims, "The Essay Examination is a Projective Technique," *Educational and Psychological Measurements*. Vol. 8 (1948), pp. 15-31.

TABLE 17-1. *The reaction of college students to questions relating to short-form objective and essay tests*

Do you prepare differently for the essay test than for the objective test?	
Yes	83 per cent
No	16
No response	1
Do you like the instructor to tell beforehand whether the test will be essay or objective?	
Yes	95 per cent
No	3
No response	2
Which type of test do you prefer?	
Objective	69
Objective	69 per cent
Essay	24
No response	7
Why do you prefer the objective?	
Easier to prepare for and write	19 per cent
Wider sampling	14
Objective grading	12
Easier to make grades	11
Better insight into student's knowledge	4
Why do you prefer the essay?	
Gives opportunity for self-expression	8 per cent
Better insight into students knowledge	8
Easier to make grades when little is known about the subject	1

freedom and complexity of the essay type of test will enable the examiner to bring his own values and interpretations into the testing situation.

3. By and large the essay examination would seem to be more useful for the information which it reveals concerning the individual than for "normative" purposes such as are commonly involved in "grading."

One of the best types of essay questions is one that is so phrased as to require the student to think through a series of related events or occurrences, and to express their outcome in terms of ideas gathered in class or from reading. For example, the question, "How did the Industrial Revolution in New England affect the people's attitudes toward states rights?" cannot be answered fully from a single quotation in a textbook. Such a question will require the student to consider the attitudes and developments related to this problem during the period following the Revolutionary War up to the industrial developments in New England. Such a question will reveal outstanding differences among the pupils in their abilities to select the significant facts and give an adequate interpretation to them in the light of developments.

It has been found that subjective tests and term papers can be scored with greater accuracy, and students can be better merit-rated on general scholarship if teachers are *trained* in making these judgments and if they follow simple rules of procedure. For example, the following rules for scoring subjective or essay tests have been found to increase the reliability of scoring.

1. Before grading any test paper, the teacher should review the textbook and lecture notes and then take the test himself. He should write down an answer which he considers to be of A worth, then one of B worth, one of C worth, etc. In this way he will know exactly what he expects of a good paper.
2. Teachers should grade all papers on one question or test item before going on to another. This is a more accurate procedure than to grade each paper completely and alone. Horizontal grading is more accurate than vertical grading.
3. Each test question should be graded on a scale of not more than *five* categories. The distribution of grades on each question should approximate normal. There should be a few in the top and bottom categories, about an equal number in the above- and below-average categories, and the largest number in the middle category. The grades on a test item in an English test were distributed as follows:

Categories	1 (Low)	2	3	4	5 (High)
Number	3	7	17	10	2

4. Test items should be carefully weighted according to importance and difficulty. Equal weight is seldom justified when the number of items is less than 25.

Constructing short-form objective tests. The short-form objective test is so framed that the correct answer may be found in a single word, phrase, or sentence. This test has the advantage of being easy to administer, easy to score, and samples a wide range of student's responses in a short period of time. The four most common forms of this test will be described. Many variations of each of these forms have been developed and may be found in recent textbooks dealing with educational achievement and evaluation.

The sentence completion test is a *recall* type of test. In general, the blank spaces in the test items should call for only one word. Care must be taken that synonyms and other words which may adequately and correctly complete the sentence are given proper consideration. The blanks may be placed at any point in the sentence. In general the larger the number of blanks occuring the greater the degree of difficulty of the test items. Care must be taken that the test is not made an intelligence or vocabulary test rather than a test of achievement covering a particular unit of subject-matter. There is also a grave danger that the test may lead to an emphasis upon factual learning as such.

Typical examples of completion test items are:

The first President of the United States was______________.

The Articles of Confederation were in force from 1781 to ________.

The unit factors in heredity are the ________________, and are located in the chromosomes.

When a pattern of light enters the eye, it passes through the pupil and strikes the ________________ where it is inverted.

The true-false, multiple-choice, and matching tests are examples of recognition types of tests. Cronbach noted that students often bring to the test-situation a number of test-taking habits, referred to as response sets, which affect their scores on the test.[9] In order to avoid the effects of response set, he suggests that the following forms be avoided in tests where high validity is important: "true-false, like—indifferent-dislike, same-different, yes-?-no, agree-uncertain-disagree, and mark all correct answers." This appears to leave a forced-choice or best-answer test. However, when the true-false form of tests is used, there are certain precautions which the teacher should observe in their construction.

1. Maintain a balance between the number of true and false items on the test.
2. Avoid making statements which are partially true and partially false.
3. Avoid making statements which are neither true nor false.
4. Avoid long and involved statements which are difficult for the pupil to comprehend.
5. Use simple language that will give the correct description of the item presented.
6. Avoid the use of such words as *sometimes, never,* and *always.*
7. Avoid personal opinions and statements given to broad generalizations.

The multiple-choice form of test is the most flexible of all the forms of the short-answer tests; but is the most difficult type to construct. The items making up the answers may be very near alike making it very difficult for the pupil to discriminate between the possible choices and thus choose the correct answer. Typical examples of multiple-choice test items are:

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[9] Lee. J. Cronbach, "Further Evidence on Response Sets and Test Design," *Educational and Psychological Measurements,* Vol. 10 (1950), pp. 3-31.

The inventor of the cotton gin is ______________.

1. Robert Fulton
2. Thomas Edison
3. Eli Whitney
4. Samuel Morse

Yellowstone Park is located in ______________.

1. Nevada
2. Montana
3. Idaho
4. Wyoming
5. Utah

Care must be taken that the following rules are adherred to in the construction of these tests: (1) Parallel grammatical construction should be maintained in the different items, (2) The different items should be somewhat similar in length. (3) Avoid using a special cycle for the arrangement of the correct items.

The matching test has the advantage of more nearly eliminating guessing than the other forms of recognition tests. It is especially useful in measuring *who, where, what,* and *when*. Like the multiple-choice test, the matching items are difficult to construct. One series of items is matched with another. For example, authors may be matched with books by placing the number of the author before the book he wrote.

_____Huckleberry Finn
_____The Deerslayer
_____Sleepy Hollow
_____Uncle Remus
_____Lord Jim

1. Washington Irving
2. Mark Twain
3. Joseph Conrad
4. James F. Cooper
5. Joel C. Harris

Knowledge of function may be measured as follows:

Indicate which of the five sources listed you would first consult to get each piece of information mentioned below:

_____________Amendments to the constitution
_____________The population of Cairo, Egypt
_____________The location of Madagascar
_____________The relation of the standard of living to the purchasing value of the dollar
_____________The sort of a person who is said to be *pusillanimous*

1. Atlas
2. Dictionary
3. Encyclopedia
4. Economics textbook
5. History textbook
6. The Bible
7. Gone With the Wind

Special care must be taken to avoid having more than one word that will give the correct answer. Other principles or rules which should be observed may be listed as: (1) Avoid cues where the grammatical construction will furnish the basis for the correct answer. (2) In general, use the same type of matching materials in a single group of matching exercises. That is, do not confuse names, dates, and perhaps proper nouns. (3) Cover a small unit of subject-matter on a single matching exercise.

Testing critical thinking. The modern teacher will not be satisfied with a testing program that does not include critical thinking on the part of the pupils. The *Wrightstone Tests of Critical Thinking in the Social Studies* are examples of techniques available for measuring careful thinking.[10] One of these tests furnishes a measure of a pupil's *ability to obtain facts* from graphs, maps, and tables of the type used in the social studies. This is a test of ability to obtain facts rather than a test of facts a students has already acquired. An example of this sort of test is shown in Figure 17-3.

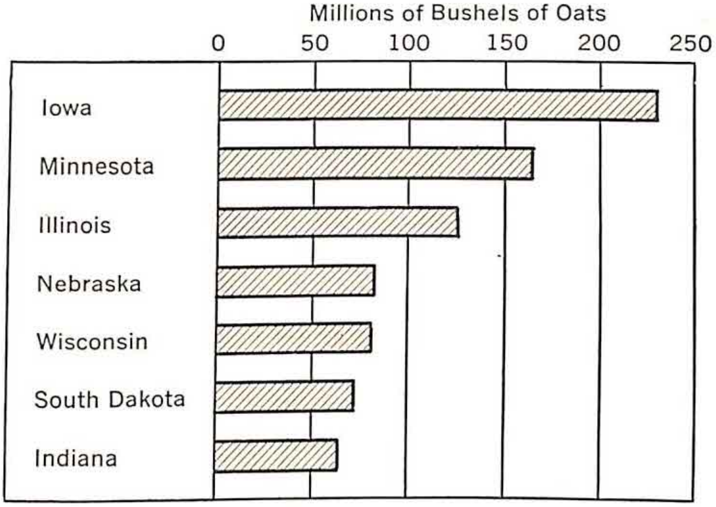

FIGURE 17-3. A sample test item from the *Wrightstone Test* of the ability to obtain facts

The number of bushels of oats grown in Illinois was about: (1) 125 million (2) 150 million (3) 125 . ( )

The state which grew the least amount of oats was: (1) Indiana (2) Nebraska (3) Iowa .... ( )

The state which grew the most oats was: (1) South Dakota (2) Iowa (3) Minnesota .... ( )

The state which grew about 57 million bushels was: (1) Nebraska (2) Indiana (3) Minnesota ... ( )

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[10] J. W. Wrightstone, *Tests of Critical Thinking in the Social Studies* (Teachers College, Columbia University, Bureau of Publications, 1939).

A more elaborate thought-provoking item is to present a table or a graph of data, or a paragraph of information and then ask a number of test items which necessitate a correct interpretation of data presented in the form of statements. The following is a typical example.[11]

Read the following paragraph for information to be used in answering the following test items:

Springs are often used as a source of water supply. Since limestone frequently has fissures or cracks underground that permit surface waters to drain into them and render the water unsafe for human use, all springs should be tested at frequent intervals to determine the condition of the water. Additional care must also be taken to prevent wastes from coming into the spring both above and below the soil surface. Great care should be taken by people before using from a spring of water which is of unknown purity.

Now, on the basis of the information just given, identify each statement below by the letter A, B, or C, according to the following legend—

A—Inconsistent with the facts stated
B—Consistent with the facts stated
C—Partially consistent with the facts stated

_____ Smell the water and if there is no disagreeable odor, drink it.

_____ Taste the water and if it tastes all right, drink it.

_____ Inspect the surroundings and if no source of contamination appears, drink it.

_____ Look for a dwelling in order to inquire about the condition of the water.

_____ Inspect the condition of the spring. If it is clean and walled against surface contamination, drink it.

_____ If the water is clear and cold, drink it.

_____ Water purifies as it runs. Go a distance below the spring and drink from the open run.

_____ Boil the water if in doubt, and then drink it.

A third test of thinking is entitled *nature of proof*. This test is designed to measure the student's ability to apply principles of logical reason to problems in science, social science, and mathematics.[12] The students are asked to react to problem situations than can neither be proved nor disproved. They are asked to discover words and phrases which when changed will give a changed meaning to conclusions presented. They are asked to identify certain major and minor premises in a problem which must be accepted if the conclusions are sound.

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[11] "Some Devices for Evaluating the Intangibles: A symposium," *California Journal of Secondary Education*, Vol. 14 (1939), pp. 331-361.

[12] For good illustrations of this type of test see E. H. Hart, "Measuring Critical Thinking," *California Journal of Secondary Education*, Vol. 14 (1939), pp. 334-338.

STANDARDIZED TESTS

In many subject matter fields tests have been carefully constructed and standardized for commercial use.[13] They have been revised often enough to bring their reliability and validity up to generally accepted standards. Their norm tables are the result of hundreds and even thousands of test scores. They are tests of proven worth. Usually they have been published and are available in quantity. There is a manual of directions for administering, scoring, and interpretation.

Some standardized tests of schoolroom learning are batteries of subtests that cover the major academic fields of learning. The *Iowa Educational Development Tests,* the *Metropolitan Achievement Tests,* the *Cooperative General Culture Tests,* and the *California Achievement Tests* are examples of test batteries. The illustration of the literature test, shown in Figure 17-4, is taken from the *Essential High School Content Battery.*[14] Subtests in these

FIGURE 17-4. Extract from a literature test

"His only alternative, to escape from the labor of the farm and the clamor of his wife, was to take gun in hand and stroll away into the woods."

1. *Rip Van Winkle*—Washington Irving
2. *Legend of Sleepy Hollow*—Washington Irving
3. *The Luck of Roaring Camp*—Bret Harte

"Injun Joe lay stretched upon the ground, dead, with his face close to the crack of the door."

4. *Life on the Mississippi*—Samuel L. Clemens
5. *Huckleberry Finn*—Samuel L. Clemens
6. *The Adventures of Tom Sawyer*—Samuel L. Clemens

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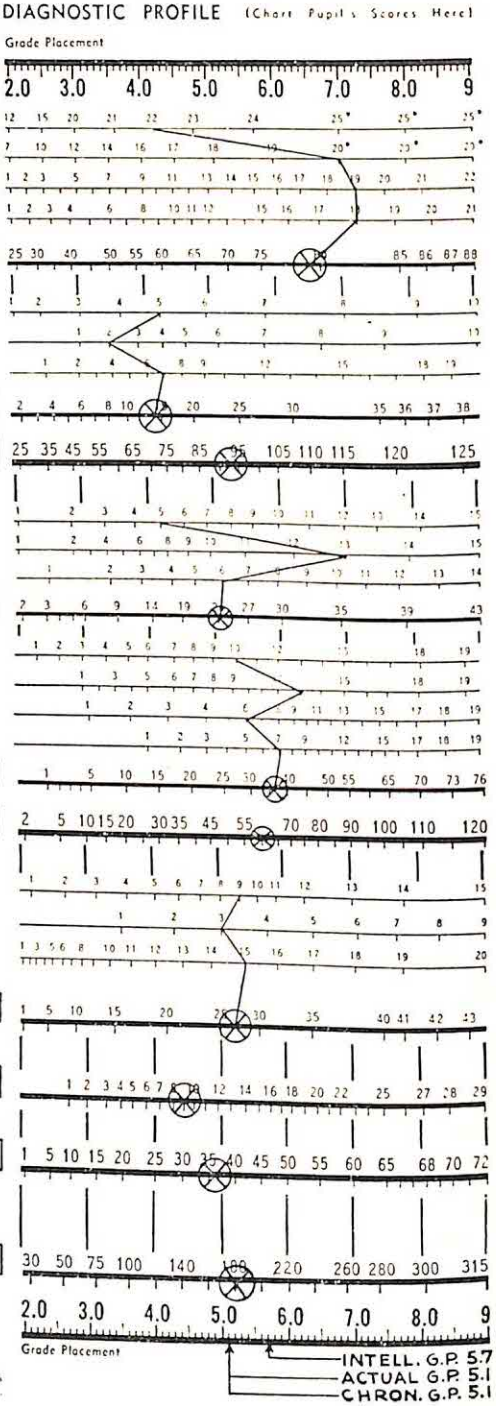
[13] The standardization of a test means that it has been given to a large number of other pupils and standards or "norms" have been determined. A score on a test is high or low depending on whether it is higher or lower than scores made by others who have taken the same test. A frequency table of scores made on a test is called a "norm table." The accuracy of measurement of a test is called its "reliability," the calculation of which is a part of test standardization. The test may be repeated to see if it gives the same scores, or the scores on a part of the test may be compared with the scores made by the same pupils on other parts. A third step in standardizing a test is the determination of its "validity" or the degree to which it measures what it is supposed to measure. If a history test uses many big words it may be a vocabulary test more than it is a history test. It would then have low validity as a history test.

[14] The *Essential High School Content Battery* is published by the World Book Company.

SAMPLE PROFILE — COMPLETE BATTERY

A Test given in October to a Low 5 Pupil. Age, 124 Months. Mental Age, 132 Months.

Test	Section	Possible Score	Pupil's Score	Grade Placement	Percentile Rank
1. READING VOCABULARY	A. Word Form	25	22		
	B. Word Recognition	20	20		
	C. Meaning of Opposites	23	19		
	D. Meaning of Similarities	22	18		
	TOTAL (A+B+C+D)	90	79	6.5	80
2. READING COMPREHENSION	E. Following Directions	10	5		
	F. Reference Skills	10	2		
	G. Interpretations	20	7		
	TOTAL (E+F+G)	40	14	4.1	20
	TOTAL READING	130	93	5.3	50
3. ARITHMETIC REASONING	A. Number Concept	15	5		
	B Signs and Symbols	15	13		
	C Problems	15	6		
	TOTAL (A+B+C)	45	24	5.0	40
4. ARITHMETIC FUNDAMENTALS	D Addition	20	10		
	E. Subtraction	20	13		
	F Multiplication	20	6		
	G Division	20	7		
	TOTAL (D+E+F+G)	80	36	5.8	75
	TOT. ARITHMETIC	125	60	5.7	70
5. MECH OF ENGLISH AND GRAMMAR	A. Capitalization	15	9		
	B. Punctuation	10	3		
	C Words and Sentences	20	15		
	TOTAL (A+B+C)	45	27	5.3	50
6. SPELLING	TOTAL SPELLING	30	9	4.5	25
	TOTAL LANGUAGE	75	36	4.9	40
	Handwriting			6.0	
	TOTAL TEST	330	189	5.4	50



* When maximum scores are achieved, plot the score which most nearly conforms to Total Reading Grade Placement.

FIGURE 17-5. Profile of a fifth-grade pupil in the *California Achievement Tests*

batteries can ordinarily be purchased separately and administered and interpreted as separate tests. Figure 17-5 shows the achievement profile of a fifth-grade pupil on the *California Achievement Tests.* Such a profile furnishes the teacher with information about the strong and weak points of the individual pupils. Such a diagnostic profile enables the teacher to plan and direct his instruction toward helping pupils overcome certain weaknesses.

Then, there are specialized standard tests which are limited to certain fields. There are tests in arithmetic, geometry, algebra, art, business, English, French, German, handwriting, health, home economics, Latin, music, biology, physics, chemistry, reading, civics, history, spelling, etc.[15] The illustration presented in Figure 17-6, taken from *Snader General Mathematics Test,* shows how the multiple-choice form of test may be used in evaluating growth in applying mathematics.[16]

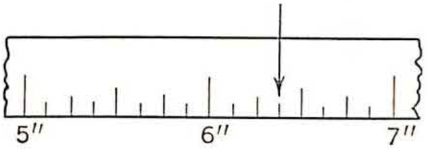


FIGURE 17-6. Illustrated test of functional mathematics

On the portion of the scale shown above, what is the reading to which the arrow points?

f. $6\frac{3}{16}$ units
g. $6\frac{3}{5}$ units
h. $6\frac{3}{4}$ units
i. $7\frac{5}{8}$ units
j. none of the above

Types of standardized tests. Standardized tests have at times been classified as (1) rate or speed tests, and (2) power or quality tests. As the terms suggest, the speed test is used to measure the number of items of somewhat uniform difficulty that the pupil can respond to in a given period of time. On the other hand, the power test is not concerned with the number of responses that the subject is able to make but rather the quality of the responses. The materials of the power test are arranged in order of difficulty, with the easier items at the beginning of the test. These tests are sometimes referred to as performance tests. Other forms of these test include composition and handwriting scales. On these scales the performance of the learner is compared with that of standard models of various levels of excellence. An excerpt from the *Metropolitan Handwriting Scale,* shown in Figure 17-7 is a typical example.

Standardized tests may further be classified according to function—*survey, diagnostic, prognostic.*

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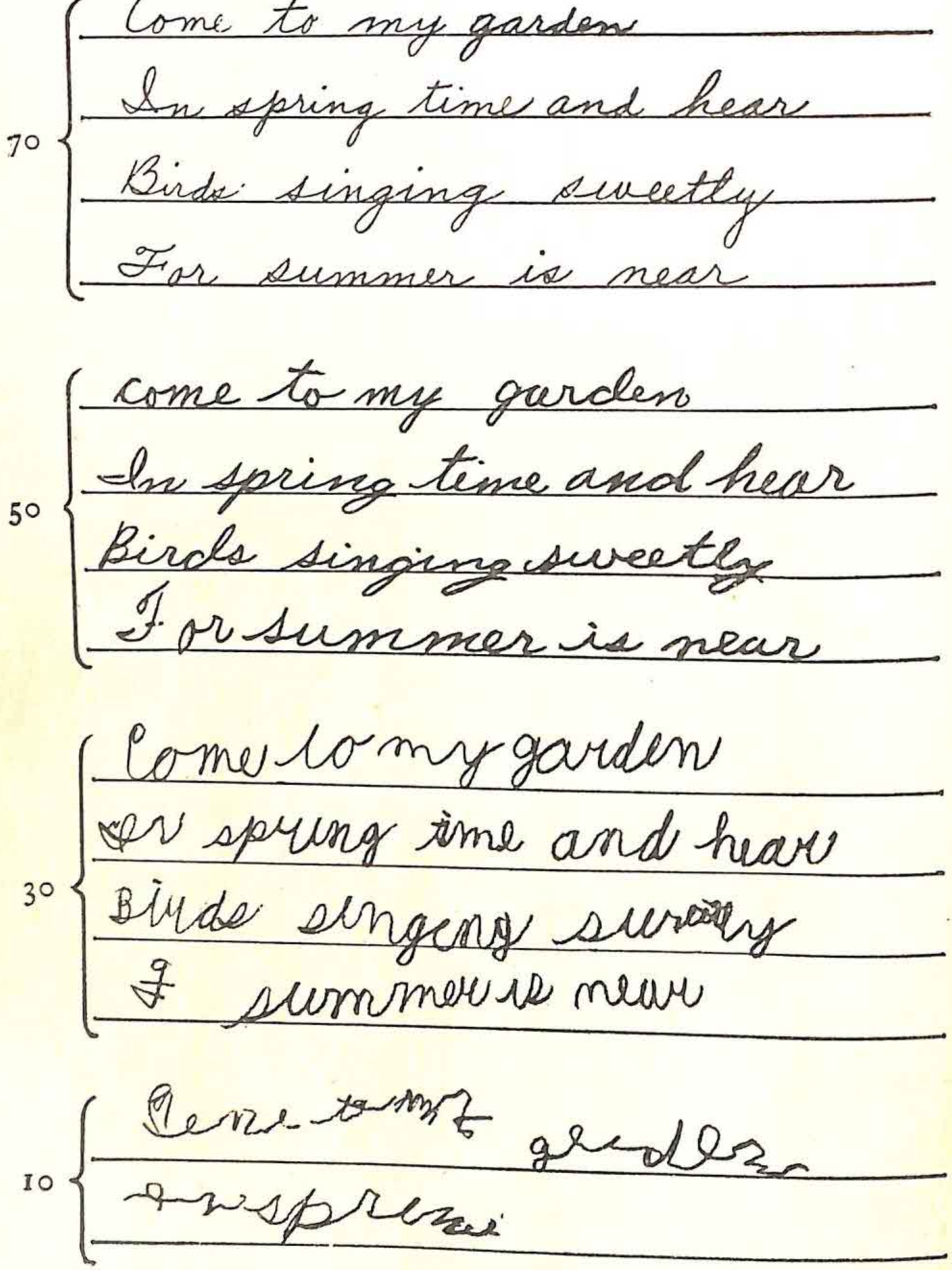
[15] *The Mental Measurements Yearbooks* edited by O. K. Buros and published periodically by The Rutgers University Press furnishes a complete and up-to-date list of tests for different fields and functions.

[16] The *Snader General Mathematics Test* is published by the World Book Company.



70

Come to my garden
In spring time and hear
Birds singing sweetly
For summer is near

50

come to my garden
In spring time and hear
Birds singing sweetly
For summer is near

30

Come lo my garden
In spring time and hear
Birds singing [illegible]
F summer is near

10

[illegible] garden
in spring [illegible]

FIGURE 17-7. Excerpts from the *Metropolitan Primary Cursive Writing Scale*

(By Gertrude H. Hildreth. Copyright, 1933, World Book Co.)

SURVEY TESTS. Survey tests are used for measuring a wide range of knowledge or skills. They are useful for determining the total achievement of the learner in a special area. The traditional final examination usually consists of ten or more items from the total area of subject matter covered in a course. This is a good illustration of the survey test; although most of these tests could not be scored very objectively. The survey tests are also useful for comparing the general performance in a given area of one group of students with another group of students.

DIAGNOSTIC TESTS. By means of diagnostic tests a pupil's performance of a complex task is broken down into several parts. A wide range of standardized tests are available which will yield a diagnostic profile of each individual being tested. The diagnostic test furnishes an analysis of each individual, since norms are given for the different abilities measured by the test. This helps the teacher determine the strength and weakness of the individual pupils, and enables her to direct the instructional program so as to remedy existing weaknesses. As illustrated in Figure 17-5, John Smith is below the median of his class in every field tested except reading vocabulary. It is also evident that his class is above the median for high school and college students in every field except language.

PROGNOSTIC TESTS. A teacher's knowledge of how fast each pupil can learn will enable him to predict and plan subsequent school work more realistically. He can plan for special assistance for slow-learning pupils and for additional work for the bright pupils. Achievement and aptitude tests are very useful in the educational guidance of students. They are also widely used in vocational guidance and other personnel activities.

Administering and interpreting results. The importance of the human factor in the testing situation has been emphasized by a number of students of this problem. The examiner or experimenter brings his own personality into the testing-situation. This sometimes has an important bearing on the attitudes and responses of those taking the test. The standardization of instructions for administering and scoring tests have done much to increase the objectivity of the testing program; however these directions must be interpreted and followed by some individual, the examiner. The examiner must also establish *rapport,* which may be less important in group testing than individual testing but is still present to a degree in all testing.

The summary of the advantages of standardized and teacher-made tests presented by Remmers and Gage seems to give a useful and worthwhile basis for the evaluation of the place and function of these tests in the testing program.

> The chief advantages of standardized tests are their possession of norms and their greater technical refinement. . . . Only where intra-pupil differences in achievement from subject to subject and from year to year are to be studied do standard tests acquire an insurmountable advantage over teacher-made tests. For general comparison of one pupil with another and of one classroom with another, teacher-made tests can easily be supplied with norms so as to enable worth-while comparisons. Our general conclusion must be that, for the major part of evaluation of achievement, teacher-made tests should be used.[17]

TEST NORMS

Perhaps the most misunderstood fact about educational measurement, on all levels from kindergarten to graduate school, is the necessity for norms or data concerning other people on the trait measurered. Teachers "grade" essay tests according to personal concepts of norms which are most intangible, obscure and equivocal. They administer the tests, the difficulty of which is unknown, and then grade them on a scale of 100 with 70 as the passing score without any knowledge of the difficulty of the test for other students. Most teachers believe that 70 represents a percentage of accuracy or proficiency which should be the minimum requirement for passing a course.

It is not clear why this cut-off score should be 70 rather than 50 or 85 or any other level. Some teachers who try to approximate a normal curve of grade distribution, consider the normal average to be between 80 and 85 and they try to make the number of grades above 95 somewhat equal to those below 70. However, few teachers who follow this pattern could describe the degree of proficiency represented by any of these grades. They have no norm standards beyond a vague indefinite "feeling" which varies between teachers and even in the same teacher at different times. They have no definite concept of what proficiency constitutes a passing grade.

As suggested in Chapter 5, it is impossible to formulate any judgment of amount or degree about anything without norms. Superiority and inferiority on a test depends on the *scores made by other people*. Every test must have norms, that is, data about its difficulty for other people. Seventy per cent of the right answers may be an appropriate passing mark for one test and entirely too high (or too low) for another test. The difficulty of the test, the time allowed for its administration, the qualifications of the students who take it, the conditions under which it is taken—are all factors which affect the appropriateness of any score as the passing or cut-off score.

[17] H. H. Remers and N. L. Gage, *Educational Measurement and Evaluation* (New York: Harper and Bros., 1943), p. 143.

The procedure of obtaining norms on a test is simply to give it to a group of students, score it on the basis of the number of points on the test (this is called the *raw score*), and arrange the scores in a table of frequency distribution. This is illustrated in Table 17-2. Note that two students are definitely below the others and should probably fail if grades were determined on the basis of this test alone. Only when scores are arranged in such a frequency distribution do they become meaningful. (If the test is being standardized for publication many more scores should be obtained.)

TABLE 17-2. *Distribution of 42 raw scores made on a test in psychology*

SCORE	FREQUENCY	CUMULATIVE FREQUENCY
66-68	1	42
63-65	2	41
60-62	3	39
57-59	8	36
54-56	7	28
51-53	7	21
48-50	4	14
45-47	5	10
42-44	3	5
39-41	0	2
36-38	2	2

Table 17-2 gives the scores for the first test only. Eight tests were given during the course and all raw scores were added together. Table 17-3 shows the distribution of these totals. Final grades were determined from this table. Incidentally, only one student got as many as 85 per cent of all items right, only six students got 70 per cent right, and twenty-two students got half the items on the test right. Three students exceeded chance by only a few points. Obviously, grades should be determined by the distribution of scores rather than by the percentage of right answers.

Frequency distributions are more easily understood when they are interpreted in *percentile ranks*. Regardless of the number taking a test, a percentile rank indicates the percentage of the total number that is excelled by that rank. A student who makes a percentile rank of 75 has made a score that is higher than 74 per cent of those who have taken the test. Table 17-3 shows the percentile rank of each score level. The score distributions of most standardized tests are stated with percentile equivalents as shown in Table 17-3. By referring to these tables any score can be made meaningful by translating it into percentile rank.

TABLE 17-3. *Distribution of total raw scores of 42 students in a course in psychology*

SCORE	FREQUENCY	CUMULATIVE FREQUENCY	PERCENTILE LEVEL
474-	1	42	100
450-474	3	41	98
425-449	0	38	90
400-424	2	38	90
375-399	0	36	86
350-374	3	36	86
325-349	5	33	79
300-324	6	28	67
275-299	4	22	52
250-274	2	18	43
225-249	5	16	38
200-224	3	11	26
175-199	4	8	19
150-174	1	4	9.5
125-149	0	3	7
-124	3	3	7

Norms, then, are tables of the distribution of scores made by other people who have taken the test in question. They may or may not constitute *appropriate* comparison for interpreting a given test score. For example, a certain test in modern history has norm tables for both high-school and college students. It was given to a group of adults who had not attended college and many had not attended high school. To interpret their scores in terms of college or even high-school percentiles is neither complimentary nor appropriate. Appropriate norms are those made up from people who are closely comparable to those being tested. A prominent intelligence test is seldom used in industry because there are no industrial norms. Scores by industrial employers on that test are not meaningful because they cannot be compared with the scores of other employees. It is essential to have norms for interpreting test scores but it is likewise essential to have norms that are appropriate comparisons with the scores being interpreted.

MARKS AND GRADES

There is in general a great deal of dissatisfaction with prevailing systems of marking and reporting the progress of students. However, research studies bearing on this problem have not led to the development and use of a system that has received widespread approval. The data presented in Figures 17-1 and 17-2 show that teachers' marks are likely to be most unreliable. Despite the fact that the percentage system has received much criticism it is still widely used. The conversion of percentages into letter grades is nothing more than an attempt to disguise the older method. The question may be raised: Per cent of *what?* A consideration of this question reveals the weaknesses of this basis which have led educators to seek sounder methods of grading.

Based on objective tests. Tests give raw scores, not school marks. Even percentile ranks are not school marks, although some teachers hold to the viewpoint that school marks should be determined only by percentile ranks on objective tests. Some believe that fixed percentile ranks should always designate the limits of school marks. As interpreted by one teacher these fixed limits are as follows:

A—91 to 100 percentiles
B—66 to 90 percentiles
C—36 to 65 percentiles
D—11 to 35 percentiles
F— 1 to 10 percentiles

Other distributions are shown in Table 17-4.

TABLE 17-4. *Percentage of students given each letter grade by various authorities*

AUTHORITY	A	B	C	D	F
Cattell	10	20	40	20	10
Meyer	3	22	50	22	3
Dearborn	2	23	50	23	2
Smith	10	15	50	15	10
Ruediger	4	24	44	24	4
Cajori	7	24	38	24	7
Ruch	6	25	38	25	6
Eells	6	22	44	22	6

Another opinion is that in small groups, school marks should be determined by the location of clusters of test scores in a frequency distribution. For example, in Table 17-3 the four scores above 450 may constitute a cluster or grade category, the two between 400 and 424 may constitute another cluster, the 18 between 275 and 399 a less defined cluster, especially at the lower limit, the 13 between 150 and 249 a poorly defined cluster at the upper limit, and the three below 125 a cluster with definite limits. The two scores in the 250-274 class could be considered as borderline cases and go either in the upper or lower cluster. (Actually both went into the upper cluster.) When these clusters are given grade indentifications they are as follows:

A—450 up (4)
B—375-449 (2)
C—250-374 (20)
D—150-249 (13)
F—Below 149 (3)

Obviously, these clusters would not fall at the same percentile levels in all test score distributions. In this distribution the A marks include all those above the 90 percentile but this cluster may go lower or higher in other distributions. The C cluster extends from the 38 to the 86 percentiles in this distribution but may be markedly different in another distribution of scores. Needless to say, this cluster procedure cannot be applied to distributions unless they are multimodal. This does not usually occur when large groups of scores are involved.

Using multiple factors. The problem has at times been raised: Should marks be based on the educational growth of the individual or his educational attainment in comparison with other members of his class? There is no uniform basis for determining marks, although most teachers take into consideration a number of factors in arriving at a student's mark in a particular area of learning. The reason for using objective test results is that additional and accurate information is needed about some aspect of the student's growth and ability. The over-all merit rating of students can be done more accurately if a few common rules are followed carefully. However, any system of marking should be based upon the purposes and functions of such marks.

The importance of complete cumulative records for the guidance of individual pupils cannot be overemphasized. A further discussion of such records will be presented in a later chapter in connection with the guidance of the individual pupil. The teacher should keep a file of "critical incidents" on each student. Memory of such events is not reliable; they should be written down at the time they occur. Many of these incidents will have a direct bearing on the educational achievement of the individual student, and should be taken into consideration when a multiple of factors are involved in the accumulation of a mark or grade.

Attitudes toward the school subject, interests displayed, originality and initiative shown are additional factors which many teachers use in arriving at a student's grade. Daily recitations are often used to determine a portion of school marks. Some teachers attempt to identify a certain per cent of their grade with daily work and a certain per cent with tests and examinations. If the mark is to denote the level of educational attainment, it should be based upon accurate and reliable data arrived at through a careful testing and evaluating program. On the other hand, if the mark is to denote the habits, attitudes, interests, and appreciations of the student the teacher will be compelled to depend upon careful observations and other techniques less reliable than paper-and-pencil tests. A sound educational and guidance program will be concerned with the whole pupil and will make use of data from many sources.

Reporting pupil progress. The report cards which pupils carry home are often a source of annoyance and difficulty to the student. Any discussion of the use of report cards should begin with a consideration of their purpose. The notion that all of the activities of the school should be organized so as to enhance the growth and learning of pupils seems to be sound. Thus, the report card should serve to enhance the personal and social development of the individual pupils, through securing increased co-operation from parents and pupils. This should be the criterion for evaluating a system of reporting pupil progress in school.

Much experimentation has been undertaken during the past two decades in an effort to arrive at more desirable means of reporting to parents. In many school systems narrative reports that are more concerned with the activities of the individual student have replaced the A—B—C type of report card. This is especially true in the case of the elementary schools. In some school systems conferences with parents have replaced the traditional report cards. This has many advantages over letter or per-cent grading, and is especially suitable to the lower elementary grades, where individual differences in background have been so pronounced as to produce wide variations in readiness for learning the various school tasks. This does not mean that differences in readiness do not exist in high school; however at this stage students are often guided in choosing learning materials more in harmony with their interests and abilities.

This procedure also places the emphasis upon evaluating the pupil in terms of his potentialities for growth rather than comparing him with others, an average, or some more or less artificial standard. It furthermore encourages the teacher to study each child carefully—noting his strong and weak points and his daily activities and habits. This should not lead to attempts to shield the child from failure and an understanding of his limitations. Children must learn to face reality and to recognize their limitations and possibilities. These are not learned, however, through a series of continuous failures. Neither are they learned through a series of easy successes. It is important for the child to develop habits of initiative and responsibility. The system of reporting pupil progress has in many cases tended to aggravate the seriousness of the problem of failure. However, some constructive efforts are being made to develop a system of reporting grades and other information about the child's development which will tend to promote rather than hinder personal growth and adjustment.

SUMMARY AND TRENDS

Although tests, examinations, and other means of appraising pupil growth and learning have been used for a long period of time, the modern testing movement is commonly dated from the work of Thorndike and others near the beginning of this century. The development of objective methods of measuring achievement is an aspect of the application of the scientific method to problems in education. These short-form objective tests were early hailed as the panacea for many educational problems. However, it was soon learned that they had distinct limitations as well as values.

The importance of norms for any type of a test is not always recognized. A "raw score" has no meaning until it is compared with the scores of other students on the same measuring instrument. The standardized test furnishes a means for comparing the scores of a given group with those from a large sampling of individuals. An examination of the structure and content of most standardized tests reveals that undue emphasis is given to the acquisition of factual information, with too little regard for broader and more fundamental educational objectives. The same condition prevails with respect to nonstandardized written and oral tests. The recognition of the limitation of present tests, especially paper-and-pencil tests has led to the development of the concept of evaluation.

Among the most frequent shortcomings of testing may be listed the following:

1. Failure of the schools to define their goals clearly, coupled with the failure of tests to measure those outcomes set forth in the objectives of the school program.
2. The failure of the teacher to recognize testing as an integral part of the total learning situation, with the accompanying notion by the teacher that testing is not part of his job.
3. The practice of giving tests spasmodically or not at all in many schools.
4. As a corollary to Number 3 we note the practice of giving many tests without any goal or purpose, with the result that the test findings are never used.

Perhaps the outstanding trend in educational measurements is that of giving more attention to the measurements and evaluation of those values formerly described as *incidental* to the learning of the academic materials. This problem of measuring the newer and more intangible objectives of modern education is one of the most difficult issues facing the teacher or test constructor. For example, how can we evaluate the effectiveness of the modern educational program in the development of wholesome attitudes, worthwhile values, good citizenship, and the like? How can the teacher evaluate with a reasonable degree of accuracy the development of good health habits on the part of Janie?

Much experimentation has already been undertaken in an effort to evaluate pupil growth in these intangibles; more studies and instruments will appear as a result of these efforts. Concerning the need for a wider application of the modern techniques of measurement Lester Crow has stated:

> We perhaps have devised measuring instruments that will help us ascertain with relative accuracy the extent to which an individual has achieved mastery of the 3 R's. Nevertheless with the trend toward *functional* learning rather than mere concern with factual materials; attention should be given to measuring those outcomes that evidence themselves in the individual's ability to utilize academic material in the conduct of his own affairs.[18]

Some of the major and most important trends in measurement and evaluation may be listed as follows:

1. Modern evaluation and measurement techniques are concerned with all aspects of the growth and learning of individual pupils.
2. There is a general recognition that evaluation and measurement is a continuous process which must be conducted all through the period of growth and learning.
3. There is a pronounced trend toward considering the growth and learning of the individual pupil in terms of his own growth record rather than norms based upon large groups of individuals.
4. Results from tests and other techniques used in appraising growth and learning are recorded on individual cumulative records.
5. Results of tests and other methods of evaluating growth and learning are made available for teachers, counselors, and others concerned with the educational program.

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[18] Lester D. Crow, "Achievement Tests and the New Education," *The Ninth Yearbook of the National Council on Measurements Used in Education 1951-52* (1951), pp. 81-84.

6. Pupil and parental co-operation are sometimes used in modern evaluating programs.
7. Individual profiles based on results of standardized tests are available for the use of teachers and others in the guidance of pupils.

Questions and Exercises

1. From your own observations as a student give evidences of the unreliability of grades. What factors would you list to account for this unreliability?
2. Carefully distinguish between subjective and objective tests. Would you say that these are *absolute* or *relative* terms? Explain.
3. Give in your own words the meaning of the following terms: Reliability, Validity, Standardized tests, Norms.
4. To what extent is the scoring of a simple recall test item subjective? Give illustrations to show that this will depend upon the nature of the item.
5. What kinds of learning are easiest to measure objectively? What would you recommend about measuring those kinds of learning which do not yield so readily to objective measurements?
6. Give the reasons why it is essential to have a clear notion about the purpose of a testing program before the selection or development of tests for such a program.
7. Elaborate upon the uses that may be made of the results of tests (Consult a book on measurements to complete this exercise.)
8. One of your students in arithmetic had 42 items of a sixty-item arithmetic test correct. What further information would you need to have in order to evaluate his ability in arithmetic?
9. Prepare a test on this chapter consisting of one essay question, three true-false, three multiple-choice, and four matching exercises.

Recommended Readings

Adkins, D. C., *et al.*, *Construction and Analysis of Achievement Tests* (Washington: U. S. Printing Office, 1947).

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CHAPTER 18

Effective Habits of Studying and Learning

SCHOOL LEARNING is limited by three major factors—the ability to learn, the will to learn, and the methods of learning. School retardation may be due to low mental ability, lack of motivation, and poor study methods. The first two are discussed in Chapters 5 and 11. In this chapter, methods of learning or study habits will be considered.

WORK-STUDY SKILLS

Values of training in "How to Study." There is ample proof that individuals left to their own devices will not in a large percentage of cases develop the best methods of study and work. This was pointed out in connection with perceptual-motor learning in Chapter 13. The results of one study, dealing with study habits in grades four to twelve, pointed out that methods of study apparently crystallize in the elementary grades and do not as a rule improve appreciably thereafter.[1] This conclusion was drawn from the fact that the same number of good study habits were found among fifth-grade pupils as the average for pupils from grades four to twelve, inclusive. Training in how to study is now a proven worth. There is evidence that even good students profit from training in study methods.

Sherburne investigated the effects of a how-to-study course on college students.[2] He found a statistically significant improvement in all factors

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[1] Noel B. Cuff, "Study Habits in Grades Four to Twelve," *Journal of Educational Psychology*, Vol. 28 (1937), pp. 295-301.

[2] J. W. Sherburne, "Problems and Outcomes of a College Remedial Program." Ph.D. Thesis (Ohio State University, 1938).

TABLE 18-1. *Effects of a how-to-study course on average test scores for 530 college students*

	TEST GIVEN AT			
TEST	BEGINNING OF COURSE	END OF COURSE	DIFF.	C. R.
Study Habits				
Men	33	61	28	7.0
Women	39	66	27	7.0
Rate of Reading	45	62	17	4.0
Comprehension	53	50	—3	1.0
General Reading	38	54	16	4.0
English Survey	41	59	18	5.0

investigated except "comprehension." His data are shown in Table 18-1. The lack of improvement in comprehension is probably due to the fact that the material on his tests to be comprehended was independent of training. However, when the how-to-study students were compared with a control group of students who had had no training in how-to-study, there was improvement on all skills tested, including comprehension, for those in the training course. Figure 18-1 shows the effects of the study-

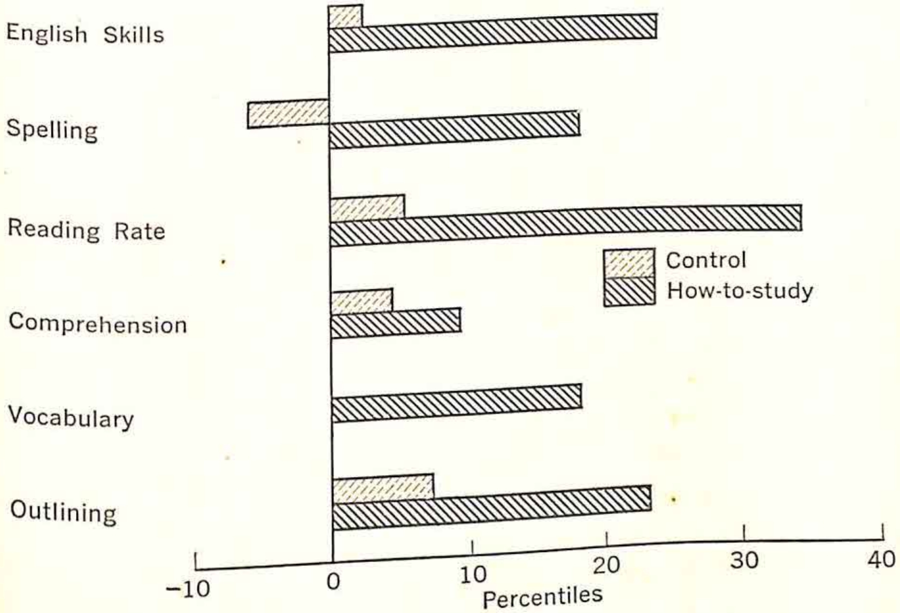

FIGURE 18-1. The effects of a how-to-study course on a group of college students as compared with a control group without the course

training course on various learning skills. All these differences were statistically significant except comprehension.

Durflinger[3] compared a group of 132 college students who were taking a course in study techniques with a control group matched carefully by paired comparison. He found a small but statistically significant difference was obtained in the grade point average of the two groups in favor of the training group (the group taking the how-to-study course).

The course even had an effect on students continuing in college. There was less dropping out of school by those who took the study techniques course than by the matched control group. These data are shown in Table 18-2.

TABLE 18-2. *The effect of a study technique course on students dropping out of college* (N = 132)

	REMAINING IN SCHOOL AFTER				
GROUP	ONE SEMESTERS	TWO SEMESTERS	THREE SEMESTERS	FOUR SEMESTERS	GRADUATED
Used special study techniques	92	69	60	49	34
Matched or control	71	48	33	30	21

Pressey[4] studied 31 pairs of probation students, carefully matched as to intelligence, academic record, age, and sex. One of each pair (31 students) was given special training in study methods for the probation term while the other (31 students) received no such training. Seventy per cent of the academic grades for the probation term received by the trained group were above the D level while only 34 per cent of the grades of the untrained group were above this level. More than half of the untrained group (16) left college at the end of the probation term while only nine of the trained group left college.

The value of a how-to-study course on the college level is reported by Bird[5] to be affected by the academic ability of the students taking the course. Students who have superior academic ability profit from a training course more than those who have inferior or average ability. This is illustrated in Figure 18-2 where superior students gained .52 grade points during the training and retained .35 grade points after the training was over, while average retained but .28 points.[6]

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[3] G. W. Durflinger, *Experimental Evaluation of a Course in College Study Techniques* (American Educational Research Association, 1949), pp. 27-32.

[4] S. L. Pressey, *Research Adventures in University Teaching* (Bloomington: Public School Publishing Co., 1927).

[5] C. Bird, *Effective Study Habits* (New York: The Century Co. 1931).

Many colleges and universities maintain a study methods clinic for benefit of students who are not making a success of academic work. The Universities of Chicago, Minnesota, Miami, Stanford, Ohio State, and Iowa have outstanding clinics for student salvage.

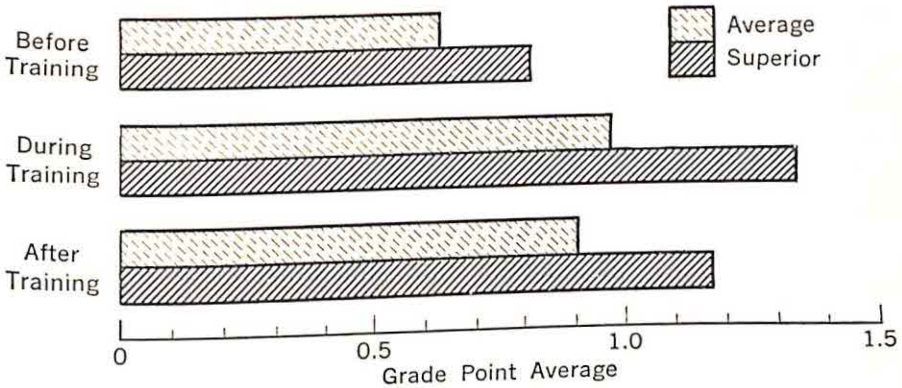

FIGURE 18-2. Comparison of students with average and superior ability before, during, and after training in how-to-study

Diagnosing study difficulties. The first step in a remedial work-study program is to analyze each student's scholarship to determine the nature and source of the difficulties. Bird found that students themselves believe that their main study problem is concentration.[7] This is followed by difficulties in note-taking, keeping up interest, reading, budgeting time, and procrastination. The relative size of each problem in the student's opinion is shown in Table 18-3.

Pressey compared the study habits of college students with good academic records with students with poor academic records.[8] He found 18 study habits which distinguished good students from poor ones. These are shown in Table 18-4.

This difference in the study habits between good and poor students, however, is not substantiated by Brown.[9] In fact he found that the small difference between the study habits of 120 good students and 211 failing

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[6] Grade points were calculated by giving letter grades the following values—A = 3 points; B = 2 points; C = 1 point; D = 1 point; and F = −1 point. A grade point average of 2.0 is the same as a B average.

[7] C. Bird and D. M. Bird, *Learning More by Effective Study* (New York: Appleton-Century-Crofts, Inc., 1945).

[8] S. L. Pressey, *op. cit.*

[9] C. W. Brown, "Study Habits of Failing and Successful Students in the First Two Years of College," *Journal of Experimental Education*, Vol. 9 (1941), pp. 205-208.

TABLE 18-3. *Ten study difficulties most frequently reported by 171 freshman and sophmore college students*

DIFFICULTY	N	PER CENT
1. Cannot concentrate. Daydreaming	141	80
2. Cannot make useful notes	65	38
3. Cannot get interested in course	59	34
4. Read too slowly	44	26
5. Study interrupted by others	38	22
6. Other activities interfere with study time	34	20
7. Procrastination	30	17
8. Cannot select important points in lesson	30	17
9. Cannot budget time for study	28	16
10. Outside work interferes with study	24	14

TABLE 18-4. *Study habits which distinguish poor college students from good ones*

HABIT	CORRECT ANSWER	PER CENT OF GOOD STUDENTS EXCEEDING POOR STUDENTS
1. Are you usually tired when you get up in the morning?	No	36
2. Do you usually study every day in the same place?	Yes	36
3. Do you frequently skip graphs or tables in your textbook?	No	40
4. Do you frequently make simple charts or diagrams to represent points in your reading?	Yes	40
5. When you find a word in your reading that you do not know do you usually look it up in the dictionary?	Yes	32
6. Do you usually skim over a chapter before reading it?	Yes	28
7. Do you usually have trouble getting the meaning of a chart or table?	Yes	28
8. Do you keep your notes from one subject together?	Yes	32
9. Do you usually take your class notes just as rapidly as you can write?	No	32
10. Do you usually take lecture notes in outline form?	Yes	28
11. Do you usually take your notes on reading in outline form?	Yes	28
12. Do you usually have difficulty expressing yourself in written work?	No	56
13. Do you usually have difficulty making complete sentences when you write?	No	28
14. Do you sit up late the night before an exam studying?	No	40
15. Do you often write an answer to a question and then find that it is the answer to some other question on the exam?	No	32
16. In preparing for an exam do you try to memorize the test?	No	28
17. Do you frequently try to analyze your work to find out just where you are weak?	Yes	36
18. Do you frequently use facts learned in one course to help you in some other course?	Yes	28

students was not statistically significant. The percentage of each group with proper study habits are shown in Table 18-5. Note that the small difference is in favor of the failing students. It would seem that at least half of both good and poor students should have training in study techniques. It is obvious from Brown's study that while good students can get along without such a course, poor students cannot. It is either remedial study for them or flunk out of school.

TABLE 18-5. *Per cent of successful and failing students with good study habits*

HABITS CONCERNING	SUCCESSFUL STUDENTS	FAILING STUDENTS
Concentration	34	40
Reading	58	61
Critical Evaluation	66	67
Note Taking	50	54
Preparation for Examinations	50	55
Promptness in Preparation	33	38
Reviewing	50	51
Average	48.7	52.1

Robinson believes that poor scholarship involves corrective procedures in three areas—study habits, educational deficiencies, and other problems indirectly affecting scholarship.[10]

DEVELOPING GOOD STUDY HABITS

It is obvious from Table 18-5 that it is not very beneficial for poor students to try to copy the study habits of good students. Good students also have poor study habits but make good grades in spite of those poor habits. It is more important to know what good study habits are and less important to know what the study habits of good students are.

In one study this problem was attacked through a survey of research and statements about good study habits. The ten rules or statements agreed upon by from 42 to 94 per cent of the studies as essential for effective work are presented in Table 18-6.[11] An examination of these statements along with research previously referred to dealing with "How to Study" shows that they are largely at the college level. However, many of these principles are applicable to the elementary grades while many principles cited later in this chapter are applicable to various grade levels.

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[10] F. P. Robinson, *Effective Study* (New York: Harper and Bros., 1946).

[11] N. B. Cuff, *Op. cit.*, p. 296. The findings of this study are given further support in the analysis of the study habits of 1,000 high school pupils by W. G. Brink, "Study Habits," *Phi Delta Kappan*, Vol. 32 (1951), p. 238.

The ten study items that were found to differentiate most clearly the able student from the poor student are listed in Table 18-7.[12] The study rule

TABLE 18-6. *The ten rules for study most frequently listed in 500 contributions*

RANK	RULE	PER CENT OF STUDIES EMPHASIZING RULE
1.	Have a Definite time for the study of specific lessons	94
2.	Get lessons alone	83
3.	Take notes on lecture	72
4.	Ignore distractions	66
5.	Skim over material before reading it in detail	55
6.	Work out individual examples to illustrate general rules and principles	52
7.	Seek a favorable environment for study	50
8.	Have a clear notion of the task before beginning	48
9.	Review previous work before beginning an advanced assignment	47
10.	Recite silently immediately after reading a lesson	42

which differentiates most clearly these students is: "Have a clear notion of the task before beginning the work of a particular study period." The second one deals with making a complete sentence while writing. This does not appear among the first ten presented in Table 18-6, but is believed by the authors to be important and will be discussed more fully at a later point in this chapter.

Review what is to be read or studied. Textbooks are written according to plan and can be read more easily if the reader knows what the plan is. That is why books have chapters and why chapters have titles. The plan of this book, for example, is the table of contents or chapter titles. This chapter is about "effective study habits." Then, the chapter has a plan—the topic headings. This topic heading is about "diagnosing study problems." Topics are also developed according to plan. The subheadings under this topic are "study habits," "educational deficiencies," and "related problems." Furthermore, each subtopic is planned in a series of ideas developed in sub-subtopics and paragraphs. It is important in reading this book to know what the plan is and to be able to understand the relation of each paragraph, each table, each graph, to that plan. The reader should know at all times what the material is leading up to. The first step in reading a textbook is to get the plan clearly in mind. Where is the author going and

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[12] *Ibid.*, p. 298.

TABLE 18-7. *The ten most significant methods of study characteristic of high-scholarship, most intelligent, and underaged groups more often than of opposite groups in 1,250 pupils of grades four to twelve*

COMPOSITE RANK	QUESTION	ANSWER BY GOOD MORE OFTEN THAN BY POOR STUDENTS
1.	Have you a clear notion of the task before beginning the work of a particular study period?	Yes
2.	Do you make complete sentences while writing?	Yes
3.	Do you seek to master all the material as progress is made from lesson to lesson?	Yes
4.	Do you grasp the meaning of a chart or table without difficulty?	Yes
5.	Do you try to interpret work at a natural break in the printed material, such as at the end of a chapter?	Yes
6.	Do you take notes while reading or studying?	No
7.	Do you work out individual examples to illustrate rules and principles?	Yes
8.	Do you provide yourself with materials required?	Yes
9.	Do you use facts learned in one class to aid in preparing for another?	Yes
10.	Do you read each topic in a lesson separately until it is clearly understood?	Yes

what are the steps the author takes to get there? Or, *what* is the author trying to do and *how* is he trying to do it?

This suggests that a book, a chapter, a topic, should be previewed before it is read. It is beneficial just to turn the pages for a brief survey before reading. McClusky equated two groups of college sophomores (118 in each) and taught one how to skim over headings and summaries before reading.[13] In a comparative reading test the overview group were equally as accurate and 24 per cent faster in reading than the untrained group.

An effective overview technique is a list of study questions. Some textbooks have study manuals which contain such questions; others have study questions at the end of the chapters; and all textbooks have topic headings which can be easily restated in question form. The title of this chapter could be stated—What are effective study habits? This topic could be—How are scholarship problems diagnosed? This subtopic could be—How should an assignment be overviewed? This paragraph could be an answer to the question—What is the value of study questions in reading?

[13] H. Y. McClusky, "An Experiment on the Influence of Preliminary Skimming on Reading," *Journal of Educational Psychology*, Vol. 25 (1934), pp. 521-529.

This all boils down to the simple fact that good study is the result of inquiry. The student should be after something and should know what it is he is after. He is taking the course and should know why. He is reading this paragraph under this subtopic, under this main topic, in this chapter, in this course—in order to get something he is taking the course to get. If he does not know what it is and how it is related to his education, he is studying under a needless handicap.

A large part of the clarity of an overview of both the textbook as a whole and a chapter in particular depends on the teacher. A good teacher can make a textbook or a chapter plan and purpose easy to understand. When he neglects to do this, the student must do it for himself—perhaps by questioning the teacher. A part of a good assignment is to give an overview of what is to be studied.

Identify important things in a reading assignment. This may be done by note-taking, by outlining, by underscoring, or in any other way desired by the reader. The procedure of identifying important material in a reading assignment is not so significant as the effect of getting it done. It makes little difference how important material is identified so long as it is identified.

No written material is all equally important. Just as books vary in importance, so do chapters within books and topics within chapters and paragraphs within topics and sentences within paragraphs and even words within sentences—differ in importance. Good reading consists of identifying those concepts of importance and remembering them.

Barton studied the value of outlining by comparing equated student groups—some trained in outlining and the others are not.[14] After a month, the groups that outlined each assignment were significantly superior to the control groups that did not outline. The critical ratio was 4.7. These results were substantiated by Salisbury who found that outlining resulted in gains that were statistically significant.[15] Table 16-6 shows that gains on tests due to outlining were significant in reading comprehension, reasoning, and information, while the gains in reading rate approached significance.

Crawford studied the relation of note-taking to school marks and found correlations of around .50 (range of .36 to .66).[16] These are as high as the usual correlations between intelligence test scores and school marks. The values of note-taking are much greater after a time interval. Evidently note-taking helps to fixate material for longer retention. Crawford's data are shown in Table 18-8.

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[14] W. A. Barton, *Outlining as a Study Procedure* (Teachers College: Columbia University, Contributions to Education, 1930), No. 411.

[15] R. Salisbury, "Some Effects of Training in Outlining," *English Journal*, Vol. 24 (1935), pp. 111-116.

[16] C. C. Crawford, "An Experimental Study of the Results of College Note Taking," *Journal of Educational Research*, Vol. 12 (1925), pp. 379-386.

Review or self-recite important things. It is not enough to merely identify important facts and ideas in a reading assignment; they must also be remembered. It has been found that the retention of material is increased by part-time recitation rather than by rereading. Gates found that meaningless materials (nonsense syllables) are remembered better when 80 per cent of the time is devoted to recitation and 20 per cent to reading.[17] The content of biographies is better remembered when at least 40 per cent of the time is devoted to recitation and 60 per cent to reading.

TABLE 18-8. *The value of note-taking immediately and after interval of time*

TEST	TIME INTERVAL	SCORE WITH NOTES	SCORE WITHOUT NOTES	DIFF. FAVORING NOTES
Essay	Short	10.70	10.32	.47
True-false	Short	7.96	7.45	.51
Essay	Long	12.89	5.66	7.83
True-false	Short	15.33	12.62	2.71

In a more recent study by Forlano, fifth- and sixth-grade children studied spelling, arithmetic, English, and nonsense syllables by devoting various portions of the study time to active recall or recitation.[18] He found that learning is more efficient when at least half the study time is devoted to reciting material that has just been read. In spelling four-fifths of the study time should consist of self-recitation and only about one-fifth of the time

TABLE 18-9. *Comparison of reading and recitation methods on immediate and delayed retention tests for spelling*

METHOD	MEAN SCORES ON RETENTION TESTS IMMEDIATE	DELAYED
All time devoted to reading	7.17	7.20
Four-fifths time devoted to reading	7.34	7.79
Three-fifths time devoted to reading	7.20	7.73
Two-fifths time devoted to reading	8.49	8.54
One-fifth time devoted to reading	8.53	9.02

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[17] A. I. Gates, "Recitation as a Factor in Memorizing," *Archives of Psychology*, Vol. 40 (1917).

[18] G. Forlano, *School Learning With Various Methods of Practice and Rewards* (Teachers College, Columbia University, Contributions to Education, 1936), No. 688.

should be devoted to looking at the book. Forlano's data on spelling are shown in Table 18-9.

It is obvious that the student who reads his lesson over and over without "talking it over to himself" is using a poor method of study. It is better to read and asborb, to read and react to, to read and self-question, to read and recite the important things read, than it is to merely read and reread.

It has been found that study questions about the material read help to make it meaningful and more easily retained.[19] Holmes equated two groups of college students (85 in each group) and had both read the same material in the history of English literature and general science.[20] One group was given a list of study questions; the other was not. Both were given the same test immediately after reading and again two weeks after reading. The group with study questions were superior on all tests and the differences were statistically significant. The critical ratios are shown in Table 18-10.

TABLE 18-10. *The significances of differences in favor of study questions in reading*

	IMMEDIATE RECALL C.R.	DELAYED RECALL C.R.
History of English Literature	3.2	9.0
Science	2.1	10.3

Germane compared the amount of learning of groups of students on both grade-school and college levels, who spent their entire study time in reading, with other groups (both grade-school and college) who spent one-half their study time in reading and one-half in answering study questions.[21] The superiority of the question method of study was 50 per cent on the grade-school level and 30 per cent on the college level.

To summarize one might say that the student should begin with a clear notion of the task ahead. This places certain responsibilties upon the teacher as one who guides the learning process. Three important steps following (P-I-R) may be listed—preview what is to be studied, identify important things, review or self-recite those things until they are learned. Students who follow this procedure will make better grades more easily than they can by neglecting any one of these steps.

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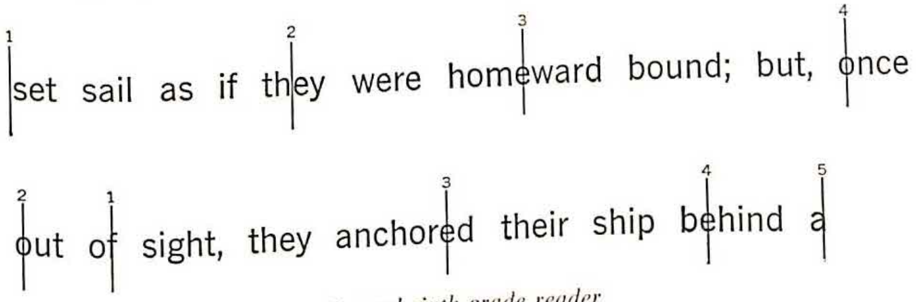
[19] Study questioning must not be confused with preview questioning, although the same questions may be used for both purposes. Preview questioning is to indicate what is to be learned. The questions are only asked, not answered. Study questioning is a check on learning. Answers are now important.

[20] E. Holmes, "Reading Guided by Questions Versus Careful Reading and Reading without Questions," *School Review*, Vol. 39 (1931), pp. 361-371. By permission of the University of Chicago Press.

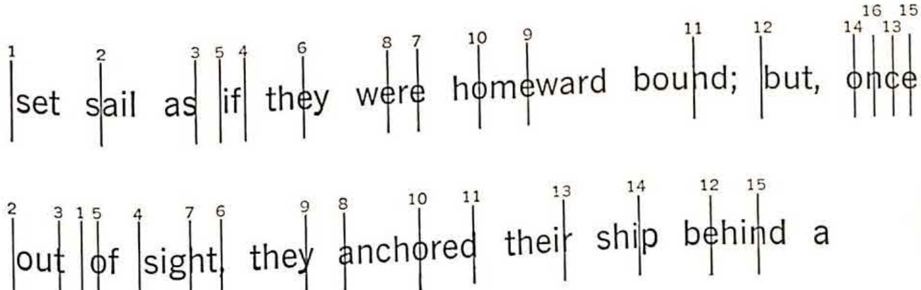
[21] C. E. Germane, "The Value of Controlled Mental Summary as a Method of Studying," *School and Society*, Vol. 12 (1920), pp. 591-593.

EDUCATIONAL BACKGROUND

All school learning is based on a foundation of other learning. There is a prerequisite background for all school work. The traditional three R's—"readin', 'ritin, and 'rithmetic"—constitute most of this prerequisite learning. Students who have learned to read rapidly, to write with skill and clarity, and to calculate with comprehension, have the necessary tools for an education. However, proficency in the three R's is relative. All reading skill can be improved; all writing fluency can be increased; and all calculating ability can be enlarged. These three basic educational tools are well worth the continued attention of educators at all levels of effort.


1 2 3 4
set sail as if they were homeward bound; but, once
2 1 3 4 5
out of sight, they anchored their ship behind a

A good sixth-grade reader


1 2 3 5 4 6 8 7 10 9 11 12 14 16 13 15
set sail as if they were homeward bound; but, once
2 3 1 5 4 7 6 9 8 10 11 13 14 12 15
out of sight, they anchored their ship behind a

A poor sixth-grade reader

FIGURE 18-3. Eye fixations of a good and a poor sixth-grade reader

Reading. Two things are important in reading skill—speed and comprehension. The attainment of *speed* in reading is largely a matter of practice. It is a well-known fact that in reading the eye makes a series of fixations at various places on a line across a page. The eye of a good reader does not see individual words but whole phrases at a single fixation. The fast reader makes few eye fixations and sees more words in each than does the poor reader. Figure 18-3 shows the eye fixations of a slow reader and of a fast reader on the same line. The slow reader had many fixations and frequent reversals. He often looked ahead too far and had to return. The good reader had but one reversal at the beginning of the second line.

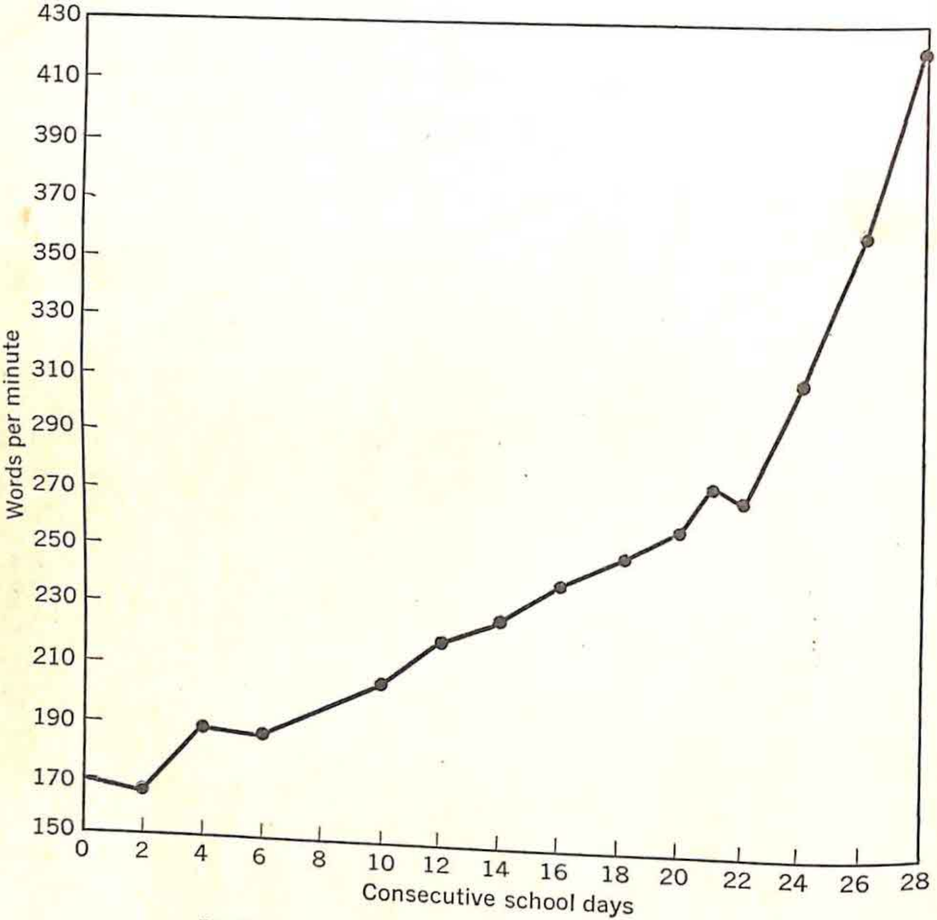


FIGURE 18-4. Effects of training in silent reading

Speed of reading, then, means a wide span of word recognition at each eye fixation.

Speed of reading can be greatly increased by practice. A few minutes a day devoted to speed reading brings about amazing results. Bear reports that while the average reading speed for college freshmen is but 230 words per minute, it can be increased to over 500 with but little practice.[22] Figure 18-4 shows the progress made by 19 sixth-grade pupils during six weeks of training in reading speed.[23] The gain in words read per minute was 147 per cent.

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[22] R. M. Bear, "Speed While You Read," *American Magazine*, Vol. 132, (1941), pp. 24-25.

Formal instruction in reading usually ends in grade 6. The reading habits acquired prior to this time are likely to persist. A wide range of reading ability will be found among students at all educational levels. In a study reported by Kottmeyer 7,380 junior-high-school pupils were given the *Traxler Silent Reading Tests.*[24] Of these, 2,169 read at or below the norms for sixth-grade pupils, while 968 were at or above the norms for the eleventh grade. The early studies of Buswell indicated quite clearly that there is but little improvement of eye habits in reading after the fifth grade.[25] His data are shown in Figure 13-3. Instruments, such as the Harvard Reading Films, the Reading Accelerator, the metronoscope, and the like have been developed for controlling and improvement of eye-movements in reading. Through these instruments the speed of exposures of different kinds of reading material is controlled and advanced as the individual progresses in rate of reading. The use of these instruments as well as other devices has become an important feature of remedial and accelerated reading programs. However, Gates has concluded: "In general, the elaborate mechanical devices should be regarded as last resorts to be used when other methods have failed or when there are some tangible reasons for selecting them at an earlier stage." [26]

TABLE 18-11. *Eye movements per line in reading at various grade levels*

GRADE	FIXATIONS (NUMBER)	REGRESSIONS (NUMBER)	DURATION (IN SEC.)
4	9.1	2.1	.25
5	10.0	3.5	.276
6	7.5	3.1	.25
7	7.8	3.5	.272
High School	6.4	2.5	.23
College	6.9	2.6	.226

It has been suggested that the greatest value of controlled reading is the motivation it provides in increasing one's speed of perception of words and phrases. Two of the major causes of poor reading are: (1) lack of practice in reading easy, interesting material, and (2) lack of motivation for increasing one's speed and comprehension. The first of these is concerned with the development of desirable reading habits through practice, and thus overcoming specific interfering habits; while the second involves motivation through continuous self-evaluation. There are other factors which affect reading speed, such as poor eyesight, poor lighting, lip movement, and the difficulty of the material being read. These are always checked by reading specialists and need be mentioned here only because they are affecting factors.

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[23] Data from F. A. O'Brien, "Training in Perception as a Means of Accelerating Reading Rate," *Journal of Educational Psychology*, Vol. 11 (1920), pp. 402-417.

[24] William Kottmeyer, "Improving Reading Instruction in the St. Louis Schools," *The Elementary School Journal*, Vol. 45 (1944), pp. 33-38.

[25] G. T. Buswell, *Fundamental Reading Habit*. (Chicago: University of Chicago Press, 1922).

[26] A. I. Gates, *The Improvement of Reading*, 3d ed. (New York: The Macmillan Co., 1947), p. 354.

Comprehension of what is read is closely related to intelligence and vocabulary size. Usually, students with high IQ.'s have large vocabularies and are able to read with superior comprehension. Correlations between intelligence and reading comprehension average about .60 with some going as high as .80. Vocabulary size can be increased rapidly if the habit is formed of looking in the dictionary for the meaning of every word in a reading assignment that is not understood. This takes time and slows down reading rate but fast reading is of no value if it is not comprehended. Understanding of the meaning of the words in reading matter is absolutely essential. No word should ever be "skipped" if its meaning is unknown. This means that a handy desk dictionary should be a part of the equipment of every student.

In addition to understanding the meaning of all words used in the material read, comprehension is also dependent on the understanding of all tables and graphs. In one sense, tables and graphs are more important than sentence material. Sentences can state opinions and theories that may be important and far from factual. Tables and graphs are usually composed of *facts* only. A table or a graph may contain more information than could be described in many times the space. A reader should *never* skip a graph or a table without "reading" its message. In this chapter for example, there is more information in the tables and graphs than in the sentences. They are put in because they tell more in less space than would be possible with sentences. Most of the information is in tables and graphs. The other material is explanatory and comments. Reading comprehension necessitates a careful study and understanding of those tables and graphs.

Reading comprehension can be developed with proper training. An important part of any how-to-study course is practice in the use of the dictionary and in the interpretation of tables and graphs. This drill does bring about improved reading comprehension as indicated in a study by Bird who gave a reading comprehension test to 272 college students before and after taking an eight-weeks course in study methods.[27] One-fifth of the group gained 50 per cent in reading comprehension and another one-fifth gained 33 to 50 per cent. At the same time reading speed increased 16.5 per cent. More detailed results of this study are shown in Table 18-12.

Writing. Second only to the ability to read in the process of education is the ability to write or communicate by means of writing. Reports, term papers, themes, and some examinations must be written. The student who is unable to communicate to others by means of writing is handicapped both in school work and in life after school. Effective writing ability is important in almost every vocation.

TABLE 18-12. *Distribution of reading comprehension scores of 272 college students before and after taking a course in study methods*

READING LEVEL	BEFORE COURSE N	BEFORE COURSE PER CENT	AFTER COURSE N	AFTER COURSE PER CENT
Below 8th grade	16	5.9	3	1.1
8th	15	5.5	5	1.8
9th	30	11.0	13	4.8
10th	34	12.5	19	7.0
11th	48	17.6	34	12.5

There are two factors in effective writing which can be studied and developed by practice—the organization of materials, and the composition or the writing itself.

The organization or outlines of material and ideas which are to be communicated by means of the writing is often more important than the writing itself. A plan for a written report is no less important than a plan for a house. A mixture of unorganized facts and ideas are difficult to communicate regardless of how well they may be described. It was stated earlier in this chapter that the first step in good reading is to preview the material to see how it is organized. The plan of written material should not be difficult to discover.

There are no fast rules for good organization of written material. It is perhaps trite to say that paucity of material interferes with good planning. It is difficult to plan limited information. A lot of material is more easily planned than unrelated bits. It is also trite to say that material should be arranged according to the objective to be accomplished. Material arranged to inform may not be effectively arranged to entertain, or to persuade, or to inspire. The organization of material, in fact the selection of the material itself, should be determined by the effect it is desired to have on the reader.

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[27] C. Bird, *Op. cit.*, p. 98.

The second factor in effective writing is the writing itself—the words used, the sentence structure, the legibility of the handwriting (or typing), the style of language. Again this comes with practice and more practice. The only way to learn to write is to write, write, and write. It is trite to say that rules of grammar should not be violated, words should not be misspelled, and punctuation marks should not be used improperly, or in ways that change the meaning intended. Skill in English usage is, of course, prerequisite to effective writing in those fields where it is a fundamental tool of communication. The mechanics of writing must have just been learned before writing can be used effectively as a tool of communication.

Perhaps a word should be said in defense of brevity and clarity in writing. A report does not need to be long to be good. "The Gettysburg Address" is not long. Great messages can be communicated in few words, if those words are chosen for clearness and exactness of meaning. The ability to write with brevity and clarity is not easily attained. It is difficult to write a sentence and make it say exactly what is meant and nothing else. It is easier to write several sentences and let all of them say approximately what is meant. The difficulty is that the reader gets only an approximate understanding of what is meant. The worth of any writing is determined by its effectiveness in communication.

Arithmetic. The third essential background for education is the ability to understand and use those calculating procedures which are so essential in dealing with quantitative material. The emphasis here is not on traditional courses in mathematics but on essential functioning processes. Much of the content of many mathematics courses has no function value for most of the students who are required to take them. Such courses are justified only by the anachronistic belief that they develop the power of reasoning in general. It has now been definitely established by research evidence that the transfer value of mathematics is limited to its usefulness in dealing with quantitative data. The analysis of the actual use of mathematical processes in ordinary living indicates that courses beyond the grade-school level are of value mainly to specialized groups. Plane geometry, for example, does not have value in all occupations. It does have essential function in certain occupations. The fundamental processes or basic skills are important in all civilized living and they should be taught in application. Courses in applied mathematics should be substituted for those courses that are justified only as exercises in "mental discipline."

Training in study methods in arithmetic consists largely of careful reading, comprehending terms and conditions, and accuracy in calculations. Brueckner found that errors of computation and errors of comprehension made up 57 per cent of the causes of 21,065 wrong answers in solving problems involving fractions.[28] Stevenson found that superficial reading, incorrect reasoning, and inaccurate calculation account for 77 per cent of errors in solving problems in arithmetic.[29] Courses in study methods should concentrate on those factors which account for poor scholarship in arithmetic.

OTHER FACTORS AFFECTING SCHOLARSHIP

Even with good study habits and adequate educational background, there are still other factors which may interfere with scholarship. The teacher should investigate each student in relation to these factors and ascertain his status of adjustment.

"Other factors" which affect scholarship may be designated as "troubles" or maladjustments. They are problems of living which have not yet been solved. To discover just what the "other factors" are which actually interfere with school work, Brown and Martin made a careful study of the troubles of 105 high-school students.[30] They found that health and financial status headed the list of troubles with concern about personality traits and mental ability close behind. Outstanding troubles that could not be resolved were lack of ambition and home conflicts. These data are shown in Table 18-13.

TABLE 18-13. *The eight troubles most frequently encountered by a group of high-school students*

TROUBLES	PER CENT OF TOTAL	PER CENT OF EACH TROUBLE—NO SOLUTION FOUND
Health and physique	15.8	29.5
Lack of finance	15.2	21.5
Personality traits	12.3	3.3
Lack of mental ability	9.8	21.0
Conflict with parents	5.3	42.8
Lack of ambition	4.3	45.8
Lack of social techniques	4.0	18.5
Lack of home stability	3.8	2.9

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[28] L. J. Brueckner, "Analysis of Error in Fractions," *Elementary School Journal*, Vol. 28 (1928) pp. 760-770.

[29] P. R. Stevenson, "Difficulties in Problem Solving," *Journal of Educational Research*, Vol. 11 (1925), pp. 95-.

[30] M. Brown and V. Martin, "Characteristics of High School Students," *University High School Journal*, Vol. 19 (1941), pp. 177-219.

Vocational aspirations and goals. High-school students who have no special vocational aspirations and goals are likely to lack motivation and direction for educational work, regardless of their scholarship ability. It is easier to study hard to become an engineer or a doctor than it is to just study hard. Early vocational plans often change but they motivate school effort and give meaning and purpose to school tasks.

Vocational counselors are now trained in methods of aptitude analysis and acquainted various occupational requirements so that their advice to students is based on facts. Students who wish to choose a vocation as appropriate as possible to their aptitudes should consult a qualified vocational counselor. There are also books and pamphlets on both aptitude analysis and occupational information which should be helpful to the student in making a sound vocational decision.

Health. Poor health is often the cause of unsatisfactory work in school. The child who is diseased or suffering from lowered vitality is unable to apply himself as completely to learning tasks as the healthy child. Just as good health tends to promote development and learning, poor health impairs the child's development and learning. The child in school looked upon by his teacher as lazy and indifferent may be suffering from diseased tonsils, defective vision, or poor hearing.

A carefully controlled study by Hardy furnished evidence that the influence of a health education program upon the educational growth of children was in direct proportion to the extensiveness of the pupil's contacts with the program.[31] Five gradations of the health education program were contrasted. The pupils making up these five groups were equated for age, general ability, school achievement, practice in the testing, certain home background factors, and general character of their school reactions. The school improvement of the five groups is presented in Figure 18-5. The pupils comprising the extensive health program made the greatest improvement, while the group that had no contacts with any aspect of the health education program made the least improvement. Although one should not generalize too readily from specific aspects of the health program, it seems most likely that a composite of all aspects of the health program had a beneficial effect upon the educational growth of the pupils. This would include the physical examination, the interviews with the teachers and others, the instructional program, and general health improvement of the pupils resulting from the health education program.

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[31] Martha Crumpton Hardy, "Improvement in Educational Achievement Accompanying a Health Education Program," *Journal of Educational Research*, Vol. 30 (1936), pp. 110-123.

Social adjustment. Potentially good students often do poor school work because they are not socially adjusted. Ability to get along and fit in with other people is very important in the lives of boys and girls of school age. Robinson has analyzed this problem into three phases—etiquette, group participation skill, and personal appearance and manner.[32]

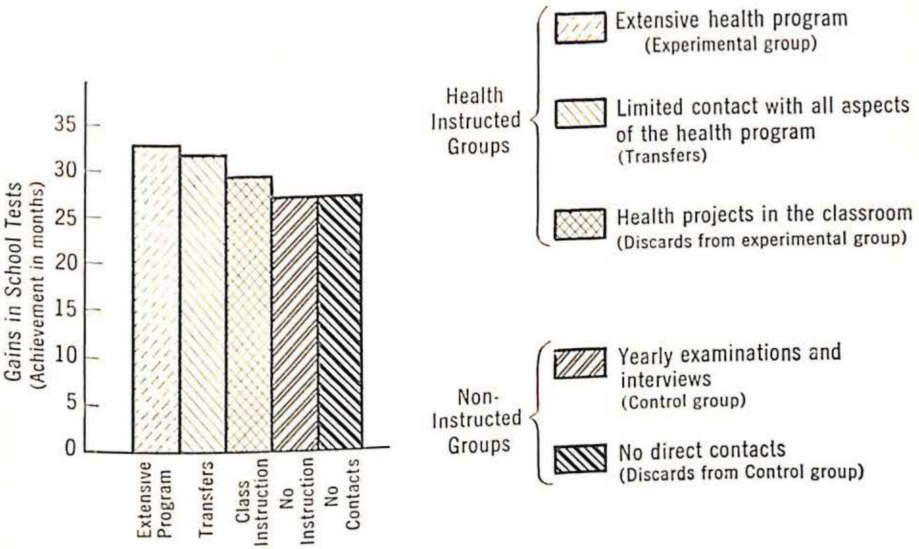

FIGURE 18-5. School improvement as related to the extensiveness of a health education program

Etiquette on the childhood level cannot be obtained from a book. It consists, as on the adult level, of doing those things in those ways that are accepted with approval by other members of the social group. It consists of acting like other members of the group. Adult standards of etiquette may or may not be accepted with approval. Whatever these social habits are, they are necessary for group membership in good standing.

Group participation skill consists of getting into social groups and participating in their activities. Some students belong to many groups, others only to a few. There is some evidence that the amount of group participation is positively related to the amount of education. Bell found that young adults (ages 16-24) who attended college belong to more than twice as many clubs as those who went no further than the eighth grade.[33] His results are shown in Fig. 18-6.

A number of studies have offered evidence that lack of club participation in high school often results from poor financial conditions or lower social-class status, whereby individuals from the middle- and upper-class groups make up most of the membership of high school clubs.

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[32] F. P. Robinson, *Op. cit.*, Project 12.

[33] H. M. Bell, *Youth Tell Their Story* (Washington: American Council on Education, 1938).

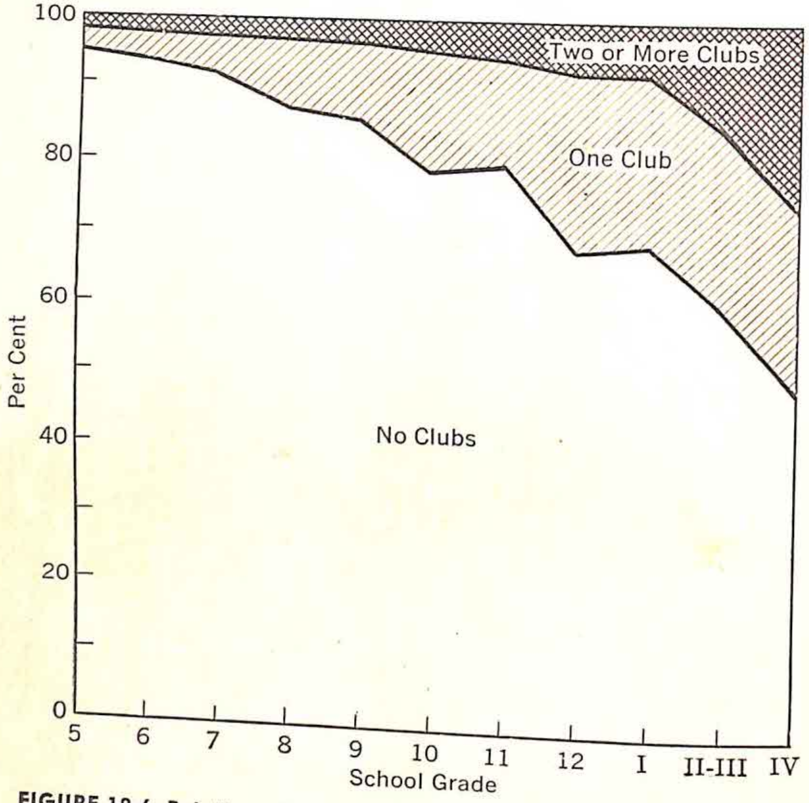

FIGURE 18-6. Relation of education to club membership young people, age 16-24

Personal adjustment. In addition to vocational ambition, health, and social adjustment, there are many problems of a personal nature that affect students. These are sometimes referred to as "self-adjustments." They frequently concern sex or other moral problems which cause a "conflict" within the personality. All individuals have such "secret problems" but usually they can make some sort of a satisfactory solution. The person who cannot arrive at a satisfactory solution of his own personal problems is "maladjusted."

There is a close relationship between physical qualifications and personal adjustments. Jones found that physical weaklings have more personal troubles than do physically strong individuals.[34] The personality profiles as obtained from a personality inventory test of a group of physically strong boys and a group of physically weak boys are shown in Figure 18-7. Note that the "strong" boys are generally above the average (standard score 50) while the "weak" boys are below the average on the traits measured.

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[34] H. E. Jones, *Motor Performance and Growth* (Berkeley: University of California Press, 1949).

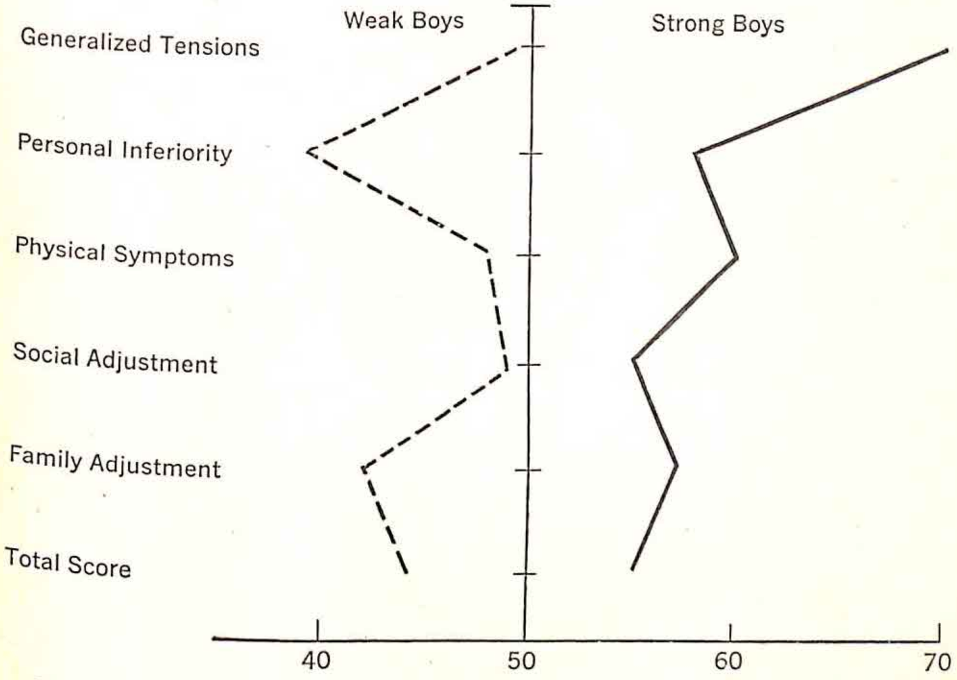

FIGURE 18-7. Personal adjustments of physically "strong" and "weak" boys

There are tests for locating personal problems, usually called "inventories." They are really trouble questionnaires and contain such questions as:

Do you daydream frequently?

Do you enjoy social gatherings just to be with people?

Do you frequently have spells of the "blues"?

Do you consider yourself a nervous person?

Do you cry easily?

Do you usually avoid asking advice?

The *Bell Adjustment Inventory*[35] contains 140 such questions which concern home, health, social and emotional adjustment. The *Bernreuter Personality Inventory*[36] contains 125 questions which are supposed to indicate neurotic tendency, self-sufficiency, introversion, dominance, self confidence, and sociability. The longest test of this nature is the *Minnesota Multiphasic Personality Inventory.*[37] It contains 550 statements which are marked *true* or *false* by the person taking the test. The following are illustrative:

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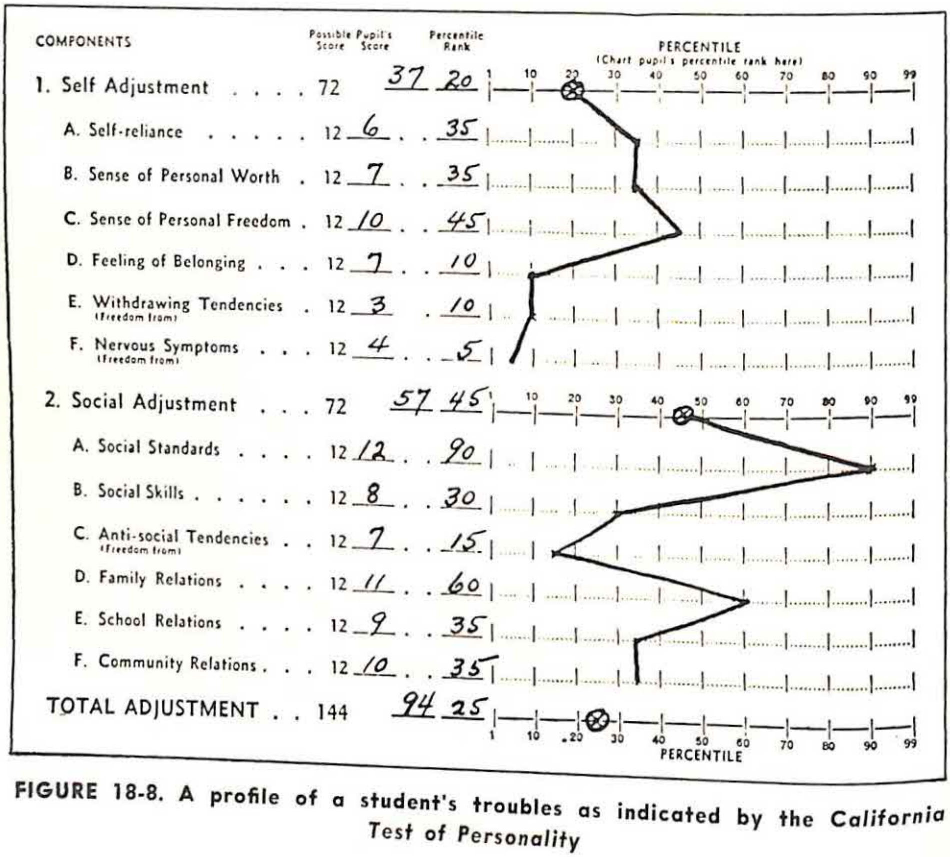
[35] Published by Stanford University Press.
[36] Published by Stanford University Press.

> At times I feel like smashing things.
>
> I hate to have to rush when working.
>
> I wish I were not bothered by thoughts about sex.
>
> I am afraid of being alone in a wide open place.



COMPONENTS	Possible Score	Pupil's Score	Percentile Rank
1. Self Adjustment	72	37	20
A. Self-reliance	12	6	35
B. Sense of Personal Worth	12	7	35
C. Sense of Personal Freedom	12	10	45
D. Feeling of Belonging	12	7	10
E. Withdrawing Tendencies (Freedom from)	12	3	10
F. Nervous Symptoms (Freedom from)	12	4	5
2. Social Adjustment	72	57	45
A. Social Standards	12	12	90
B. Social Skills	12	8	30
C. Anti-social Tendencies (Freedom from)	12	7	15
D. Family Relations	12	11	60
E. School Relations	12	9	35
F. Community Relations	12	10	35
TOTAL ADJUSTMENT	144	94	25

FIGURE 18-8. A profile of a student's troubles as indicated by the California *Test of Personality*

Such trouble inventories are useful in diagnosis but are of little value in measuring personality traits or the degree of adjustment. They are valuable tools when used in personality therapy but they should not be considered as tests or measuring devices.

What are some of the personal problems which bother students enough to interfere with their school work? These are indicated by the frequency of questions concerning various personal problems on inventory tests. Table 18-14 shows the classification and frequency of items on the *Minnesota Multiphasic Inventory*. Some problem inventories use a graph to indicate the area of problems. Figure 18-8 shows the problem areas for a student on the *California Test of Personality*. It is obvious that this student has high social standards but does not participate in social affairs. He is nervous and does not feel that he "belongs." The reason for this would probably be found in his answers to some of the questions in these areas. The inventory indicates the area of the student's troubles and further investigation can then determine causes and remedial procedures.

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[37] Published by the University of Minnesota Press.

TABLE 18-14. *Frequency of items on the* Minnesota Multiphasic Personality Inventory *in various fields of problems*

RANK	PROBLEM CLASSIFICATION	NUMBER OF ITEMS
1.	Social	72
2.	Masculinity-feminity	55
3.	Law and order	46
4.	Morale	33
5.	Affect, depressive	32
6.	Delusions, ideas of reference	31
7.	Phobias	29
8.	Family and Marital	26
9.	Affect, manic	24
11.*	General neurologic	19
11.*	Habits	19
11.*	Religion	19
13.	Occupational	18
14.	Sex	16
15.	Pretense of personal status	15
16.	Obsessions and Compulsions	15
17.	Education	12
18.	Cranial nerves	11
19.	Gastro-intestinal	11
20.	Vasomotor, speech, secretary	10
21.	General health	9
22.	Sadistic, Masochistic	7
23.	Motility and coordination	6
25.	Sensibility	5
25.	Cardiorespiratory	5
25.	Genitourinary	5

* When several items have the same frequency they are assigned a midpoint of the ranks these items would ordinarily be given.

When personal problems become intense the person becomes "frustrated." Everyone has a frustration endurance limit. Some people can stand more than others but frustrations of long duration have detrimental effect on any personality and may result in insanity. Frustrating troubles should be resolved, especially in the lives of young people.

Attention or concentration. Many students have difficulty attending to the materials being studied. They think about something else while going through the mechanics of studying. We usually say they fail to concentrate or "pay attention." There are reasons for "wool-gathering" or "mind-wandering," and there are ways to avoid it. Some of the remedy has already been reviewed in the preceding pages. If an assignment is previewed and then the important things identified by note taking or underscoring, and then reviewed by reciting it to one's self, the problem of concentration has been pretty well taken care of. It is not so difficult to concentrate when the study is an active or doing process.

Distractions account for some lack of concentration. It is difficult to concentrate in a situation filled with distractions. Student's study rooms are sometimes cluttered with athletic equipment, pictures, radios, and other bric-a-brac which make concentration on school work extremely difficult. The study room should be patterned after the average library reading room —indirect lighting of at least 10 foot candles on the book, a study table with nothing on it that does not pertain to the material being studied, freedom from all but subdued noises, freedom from interruption, and adequate ventilation and heat control.

Students often try to study at unusual times and then wonder why they cannot concentrate. Study should be scheduled as rigidly as class meetings are scheduled. It makes but little difference when mathematics, for example, is studied if it is studied at that time and in that place everyday. When a boy plays the radio at three o'clock one day, entertains some friends at that hour the next day, goes to a picture show at three the next, and then tries to study mathematics at three o'clock the fourth day, he is likely to have difficulty concentrating. The reason is that he has not formed a habit of concentrating on mathematics at that hour. A rigid schedule of study time is a long step toward concentration.

Concentration is largely a result of interest. Inability to concentrate is really a lack of interest, or at least an interest that is stronger than interest in other things at that time. Ways of developing interest (discussed in Chapter 12) are also ways of controlling concentration.

SUMMARY

This chapter has briefly surveyed some of the research that has been done concerning study problems and the factors that affect scholarship. It was found that even good students can profit from training in study methods. The formula of good study is P-I-R—*preview* what is to be studied, study it by identifying the *important things,* and *review* those important things until they are learned. This requires an adequate educational background in the three R's—"readin, 'ritin and 'rithmetic." Proficiency in these three are essential. Other factors which may affect scholarship are—lack of vocational motivation, poor health, social maladjustment, unsolved personal problems, and inability to concentrate. When these factors are controlled, when there is adequate educational background, and when the P-I-R procedure is followed, good scholarship will usually be the result.

FORM FOR CLASS AND STUDY SCHEDULE

Students name____________________________

	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Morning	7–							
	8–							
	9–							
	10–							
	11–							
	12–							
Afternoon	1–							
	2–							
	3–							
	4–							
	5–							
	6–							
Evening	7–							
	8–							
	9–							
	10–							
	11–							

Questions and Exercises

1. Why is training in good study methods important for both good and poor students? Are good study methods more or less difficult to acquire than poor study methods?

2. Explain the P-I-R study procedure. Give justification for each step.
3. How can reading speed be improved? How can the comprehension of reading material be improved?
4. What are some factors in good writing? What are some of the major barriers to the development of good writing ability?
5. Show how the nature of the examination affects the methods of study a student might employ. Cite instances where this has operated in your own experiences.
6. What is meant by social adjustment? How is it related to scholarship? Is this relationship direct or indirect? Explain.
7. How is the ability to concentrate related to the effectiveness of study? How can the ability to concentrate on study material be improved?
8. Show how one's attitude toward his teacher or the particular subject area affects study. How does this affect the retention of materials?

Recommended Readings

Bean, Kenneth L., *Construction of Educational and Personnel Tests* (New York: McGraw-Hill Book Co., 1954).

Bennett, M. E., *College and Life* (New York: McGraw-Hill Book Co., 1952).

Bird, C., and Bird, D. M., *Learning More by Effective Study* (New York: Appleton-Century-Crofts, Inc., 1945).

Brink, W. G., *Directing Study Activities in the Secondary Schools* (New York: Odyssey Press, 1937).

Burton, W. H., *The Guidance of Learning Activities* (New York: Appleton-Century-Crofts, Inc., 1952), Chap. XI.

Diehl, H. S., *Healthful Living* (New York: McGraw-Hill Book Co., 1941).

Frederick, R. W., *et al.*, *A Guide to College Study* (New York: Appleton-Century-Crofts, Inc., 1947).

Lewis, N., *How to Read Better and Faster* (New York: Thos. Y. Crowell Co., 1944).

Robinson, F. P., *Effective Study* (New York: Harper and Bros., 1946).

Wrenn, C. G., *et al.*, *Study Habits Inventory* (Palo Alto, Calif.: Stanford University Press, 1941).

CHAPTER 19

Adjustment Problems of the School Child

IT HAS BEEN emphasized in previous chapters that adjustment and maladjustment involve two elements—the *child* and *his environment*. His environment includes not only the school but the home, playground, church, companions, and other relevant factors and conditions which he encounters in his day-by-day contacts. Thus, it is obvious that any change produced in the individual child must take into consideration environmental elements outside as well as those within the school situation.

Since the school situation is dynamic and progressive in nature, the child is constantly faced with adjustment problems at school. There are certain hazards to the child's adjustments at school which include:

1. Lack of readiness for many of the experiences encountered at school.
2. Lack of harmony between the abilities of individual children and the tasks with which they are confronted.
3. Lack of interest of individual children in the various school activities.
4. Undue emphasis upon competition in the form of contests, grades, and the like.
5. Lack of understanding of child nature and needs by many teachers.
6. Maladjustments which sometimes appear in teachers.

It is the province of this and the following chapter to present materials to (1) give the student a better understanding of the adjustment problems of school children, and (2) furnish him with useful information on the guidance of the individual pupil.

INDIVIDUAL DIFFERENCES

Individual differences are apparent in any classroom. Teachers have, throughout the ages, observed that some children were able to learn faster than others. Before 1900, however, very little scientific information was available about differences among children in their school performances. Oftentimes differences observed were attributed to such factors as laziness, lack of concentration, or other factors for which the children themselves were largely responsible.

How children differ. It is important to remember that no two of the millions of children enrolled in our schools are identical. It is well known that children from the same family may differ enormously. A study of two brothers will show how differences appear.

The older brother, Jack, is a modest boy of 15. He is slender in his body build, a capable student, and especially interested in English and modern language. He is a leader in dramatics and is very popular with his teachers and a certain group of students. He says that he wants to go to college and major in English and dramatics.

Henry, a brother of Jack, is about 13 years of age. He is also of slender build, but displays more interest in sports than Jack ever displayed. His greatest ambition is to make the baseball and basketball teams when he gets into high school. He is popular with practically all of the students, and generally accepted by his teachers; although he had difficulty with one during the past year over failure to get his assignments in on time.

Distribution of abilities in school. In any school system there will be found a wide range of abilities in spite of careful efforts often made to give all the pupils the same instruction, the same attention, and the same stimulation. Statistical analyses of test results show that individuals vary widely in any measurable capacity. A study of the distribution of educational abilities should consider the following factors: (1) the range of scores, (2) the overlapping of scores for the different grades, (3) the general nature of the distribution, and (4) the central tendencies of the different grades.

In this connection Waite reported a range of over six years in reading achievement of third-grade pupils in the Omaha public schools.[1] The distribution of reading scores presented in Table 19-1, extends from the 0.5-grade level to above the seventh-grade level. About one-third of the 2,212 pupils tested had a reading achievement appropriate for their grade. This condition is not peculiar to the schools of Omaha, but has been noted by students of educational psychology since the development of modern methods of evaluating pupil growth. A wide range of ability and a marked amount of retardation in reading, spelling, or arithmetic will be found in any typical class in the elementary school. In the high school the amount of retardation is sufficiently great to warrant special remedial instruction.

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[1] W. H. Waite, "The Improvement of Reading in the Omaha Public Schools," *The Elementary School Journal*, Vol. 48 (1948), pp. 305-309. By permission of the University of Chicago Press.

TABLE 19-1. *Distribution of* 2,212 *third-grade pupils according to grade score on the Chicago Reading Test B, Form* 3

GRADE	NUMBER	PUPILS PER CENT
6.6-7.5	51	2.3
5.6-6.5	60	2.7
4.6-5.5	193	8.7
3.6-4.5	407	22.5
2.6-3.5	742	33.6
1.6-2.5	630	28.5
0.5-1.5	39	1.7

There is a common misconception that differential instruction in the early grades will reduce the range of differences appearing in the upper elementary grades. Various studies of this problem indicate that the converse is true. A good educational program will give each child the opportunity and provide for him an incentive to learn in accordance with his abilities and needs. An effective differentiated instructional program will in most cases increase rather than decrease individual differences, especially in more complex and abstract types of learning materials.

Children classified as exceptional. Exceptional children are usually defined as those so different in mental, physical, or emotional and social characteristics that special educational provisions must be made for them if they are to receive the optimal benefits of educational opportunity for all children. This would include children under six years of age, children of elementary-school age, and adolescents of secondary-school age. The mentally retarded, the mentally gifted, the blind and the partially seeing, the deaf and the hard-of-hearing, the crippled, the delicate, the cardiopathic, the epileptic, the speech defective, the cleft-palate, and the socially or emotionally maladjusted constitute the groups to which special educational considerations are usually given.

Again, there are those children from various minority groups who are faced with culturally imposed handicaps in their relations with other children and with social institutions in general. One might consider the underprivileged child as handicapped, since he is unable to participate in many activities within the larger community. The importance of these factors in producing maladjustments, delinquency, and school problems has been emphasized by a number of students of this problem. However, these are not usually referred to as the exceptional children or handicapped children.

Although one would not classify exceptional children as maladjusted, they present special problems which must be reckoned with by the schools. There are four distinct categories which will be given special attention in this chapter. These are: (1) the mentally gifted, (2) the mentally retarded, (3) the physically handicapped, and (4) the emotionally and socially maladjusted. The approximate number of exceptional children classified in each of these categories is presented in Table 19-2. This furnishes a general estimate of the probable incidence of exceptional pupils in a school system.

TABLE 19-2. *Approximate number of exceptional children five to nineteen years of age per thousand school population*

CATEGORY	NUMBER OF PUPILS PER 1,000 PUPILS ENROLLED	
Mentally gifted		20
Mentally retarded		20
Exceptional because of problems related to physical defects or disease or disorder		59
Blind and partially seeing	2	
Deaf and hard of hearing	15	
Crippled	10	
Delicate (of lowered vitality)	15	
Speech defective	15	
Epileptic	2	
Emotionally disturbed or socially maladjusted (behavior problems)		25

THE GIFTED CHILD

The gifted child has been generally described as a child possessing a very high IQ as determined from standard intelligence tests. The identification of those students with superior intelligence serves a twofold purpose. The immediate purpose is to help the teachers and others concerned identify those students who have the ability to do superior school work and to provide a program in harmony with their needs and abilities. A long-range purpose of such an identification is to assist the pupils, their parents, and teachers and counselors to guide their educational and vocational planning and growth better.

The large-scale Stanford study begun in 1921 under the direction of Lewis Terman was designed to determine the physical, mental, and personality traits characteristic of gifted children.[2] The gifted children were found to be accelerated on a three-hour achievement test about 44 per cent of their age. However, the advanced achievements were not equally high in all school subjects. Of the subject areas tested, the gifted group was most advanced in reading, language usage, arithmetic reasoning, science, literature, and the arts. The typical gifted pupil of the Terman study read more books than did most children, but he was clearly no bookworm. He displayed normal interests in sports, made collections of beetles, coins, Indian

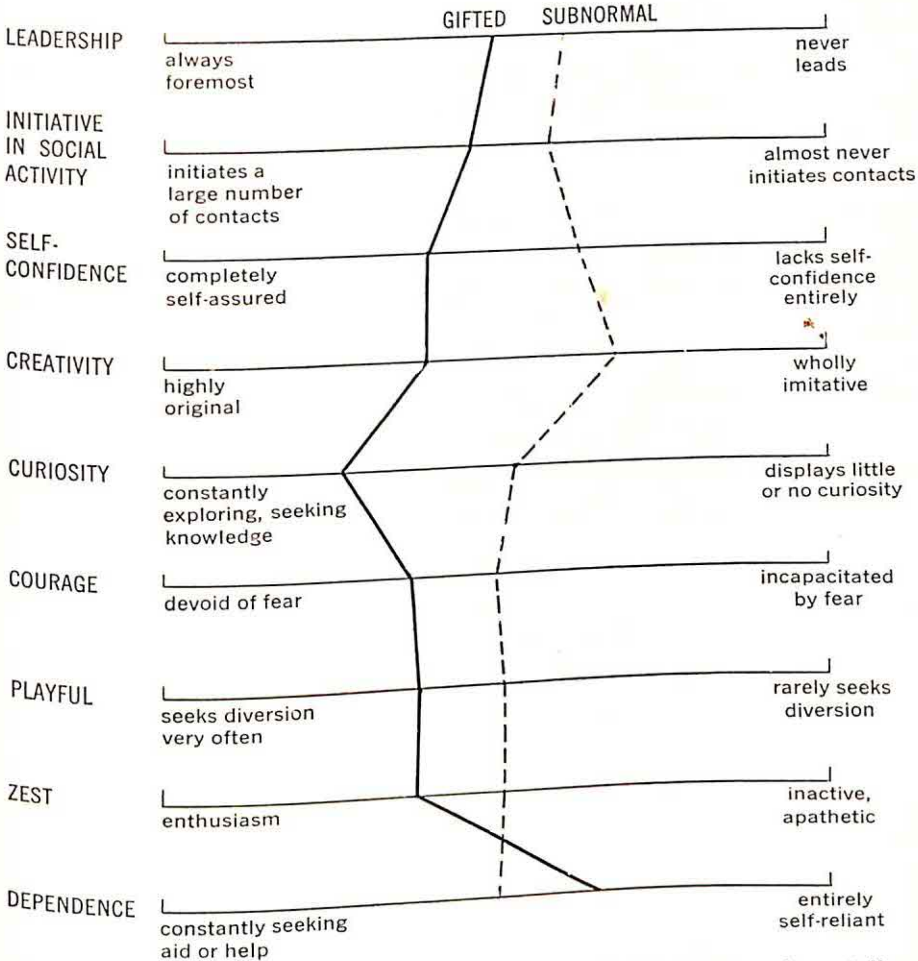

FIGURE 19-1. Mean or median ratings assigned mentally gifted and mentally subnormal groups on personality ratings

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[2] Lewis M. Terman, *Genetic Studies of Genius. Vol. 1. Mental and Physical Traits of a Thousand Gifted Children* (Stanford: Stanford University Press, 1925).

arrowheads, and match covers, and showed a superior personality development.

A comparative study of the characteristics of bright and dull pupils was conducted by Lightfoot.[3] The bright group consisted of 48 children with IQ's from 120 to 200, with a median of 147; while the dull group consisted of 56 children with IQ's ranging from 68 to 104, with a median of 88. The groups were carefully rated on forty personality characteristics. The mean ratings of the two groups on certain characteristics in which they were markedly different are shown in Figure 19-1. The means were found to be farthest apart on creativity, self-confidence, curiosity, concentration, achievement, and rivalry. The eighteen attributes for which the differences between the means of the groups were not statistically significant are:

Selfishness
Emotionality
Obedience
Kindliness
Verbal aggression
Defensive
Desire for appropriation
Physical aggression
Protectiveness
Antagonism to authority.
Reticence
Exclusive

In school the bright child is often neglected, since he is able to make satisfactory progress without much assistance or guidance from his teacher. One of the prime needs of many bright children is the stimulation which would cause them to achieve more with their potentialities. Sometimes they are accelerated in their school work. This method of providing for the educational needs of the bright child is disapproved by some on the ground that it fails to furnish him the needed opportunities for social development; however, there is little scientific evidence to support this contention. Any sound program of education will provide for the *total development* of the individual child and will stimulate him to exert his maximum efforts in the development of his potentialities.

THE MENTALLY RETARDED

It has been estimated that from 2 to 3 per cent of the school population is so mentally retarded that special educational services are necessary for their educational development. Before a sound educational program can be planned for the slow-learners it is essential to discover these pupils among the school population and to determine the extent of their mental retardation. The fact that there are various degrees of mental retardation makes it even more difficult to provide an adequate educational program for these children. The mentally retarded pupils have been defined by Doyle as:

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[3] Georgia F. Lightfoot, *Personality Characteristics of Bright and Dull Children* (Teachers College, Columbia University, Contributions to Education, 1951), No. 969.

> All minors of compulsory school age who because of retarded intellectual development as determined by individual psychological examination are incapable of being educated profitably and efficiently through ordinary classroom instruction but who may be expected to benefit from special educational facilities designed to make them economically useful and socially adjusted.[4]

The mentally retarded child is significantly inferior in the ability to learn when he enters school at the age of six. He is definitely not ready for learning to read. The teacher finds it extremely difficult to teach slow-learning pupils with mental ages of four and five years the same skills and content which children six years and more are able to learn. Thus, these children fail to make much progress in their school work during their first year in school. As they move up through the grades, the rate of mental growth continues to lag behind that of the average child so that at the age of twelve years their mental ability is several years behind that of most of the children in school. This condition creates some challenging problems which the teacher will not be able to solve through her own efforts alone. The nature of this problem may be observed from a study of the growth in reading ability of two groups of children differing in intelligence, shown in Figure 19-2.[5] These curves show that the upper intelligence group maintained its superiority in reading throughout the grades studied.

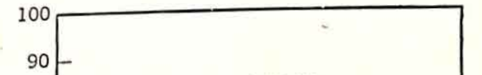

FIGURE 19-2. Comparison of reading performances of two groups of boys at different IQ levels

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[4] Francis W. Doyle, "Questions on the Education of Mentally Retarded Minors in California," *Bulletin, State Department of Education*, Vol. 19 (1950), No. 1.

[5] The materials of Figure 19-2 are taken from Albert J. Huggett and Cecil V. Millard, *Growth and Learning in the Elementary School* (Boston: D. C. Heath and Co., 1946), p. 122.

The differences in learning ability of the mentally retarded and average child are also reflected in certain qualitative differences. The mentally retarded child is not able to form the associations between old and new experiences as readily as the typical school child. They depend to a greater degree upon rote memory or drill for learning and remembering certain materials. This will be reflected in methods of teaching average and slow-learning pupils. The slow-learner will profit more by drill on deductive principles and rote-drill on arithmetic fundamentals than by teaching methods which make use of association learning largely to the exclusion of drill.[6] The teacher of the slow-learner should recognize this and make use of drill and the simplest single type of associative learning.

A second characteristic of the slow-learners is their interest in the concrete rather than the abstract. The competent teacher will not introduce learning materials beyond the comprehension ability of the learner. This was clearly shown in a study by Cruickshank in which he compared the ability of mentally retarded children to understand certain arithmetic processes with that of normal children.[7] The *Buswell John Diagnostic Chart for Fundamentals in Arithmetic* was administered to determine differences in types of errors made during the solution of simple arithmetic problems. Four general types of errors were noted among the mentally retarded. These are listed as: (1) habits including certain primitive or immature procedures, such as counting on fingers, making marks on paper, and the like; (2) habits of a technical nature: outstanding among these habits are those showing a lack of proficiency in the use and manipulation of combinations involving zero; (3) carelessness, manifested in such activities as adding carried numbers, forgetting to carry, guessing, and the like; and (4) errors in reading. The major poor habit demonstrated by the control group is that of carelessness.

THE PHYSICALLY HANDICAPPED

There are many cases of maladjustments in school in which the situation is complicated by some physical condition operating as a handicap. However, there are many factors in a well-motivated school situation which may give the physically handicapped child an opportunity to develop as a well-adjusted personality. The greater amount of maladjustments found among the physically handicapped results primarily from the limitations which such a condition entails. The limitations which will be discussed here are markedly affected by such factors as: (1) the severity of the handicap; (2) the duration of the handicap; (3) changing characteristics of the handicap; (4) the attitude of the parents toward the handicap; (5) the attitude of the child's classmates toward the handicap; and (6) the nature of the educational program for the handicapped.

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[6] R. E. Michael, "Relative Effectiveness of Two Methods of Teaching Certain Topics in Ninth Grade Algebra," *Mathematics Teacher*, Vol. 42 (1949), pp. 83-87.

[7] William A. Cruickshank, "Arithmetic Work Habits of Mentally Retarded Boys," *American Journal of Mental Deficiency*, Vol. 52 (1948), pp. 318-330.

Since much of personality development is dependent upon one's contact with situations, any limitations to such contacts will serve as a handicap to wholesome personality development. The child who because of cerebral palsy is unable to participate in many out-of-door games is thereby restricted in the full realization of certain needs. He is thus forced, through circumstances beyond his control, to narrow his goals of self-realization. The child who because of visual difficulties is unable to make normal progress in reading is restricted in the acquisition of reading skills, and thereby limited in his educational growth and the realization of certain needs through successful reading experiences.

Sensory defects. The child with defective vision or who is hard of hearing is seriously handicapped in his personal and social development as well as in his school performances. The visually defective present a serious problem because of the frequency of the difficulty and the importance of eyesight in learning the various tasks encountered at school and elsewhere. A survey of eye refractions in the Eastern Health District of Baltimore by means of monthly interviews with the housewife or some other adult member of the household showed two definite peaks in the age curves.[8] The first was at 10-14 years of age, while the second appeared at 45-54 years. The results of the study, presented in Figure 19-3, show an excess of females over males in refraction rates at both peaks. Although these data are not based on an actual assessment of visual acuity, it was noted that the refraction rates per 1,000 was highest among individuals of the lowest income groups.

Estimates of hearing defects among children of school age run as high as 3,000,000 or more.[9] There is considerable evidence that impaired hearing may be a contributing factor to emotional and social maladjustments. DiCarlo points out that teachers who are ignorant of the child's hearing disability, sometimes label the child as dull or stupid.[10] On the other hand,

[8] *Dental, Eye, and Preventive Medical Services* (Public Health Monograph, No. 16, U. S. Department of Health, Education, and Welfare, 1953).

[9] Ira Lunan Ferguson, "The Problem of Our 3,000,000 Children of School Age with Hearing Defects," *The Bulletin of the National Association of Secondary-School Principals* (November 1951), p. 97.

[10] Louise M. DiCarlo, "An Educational Program for Children with Impaired Hearing," *Elementary School Journal*, Vol. 49 (1948), pp. 166-170.

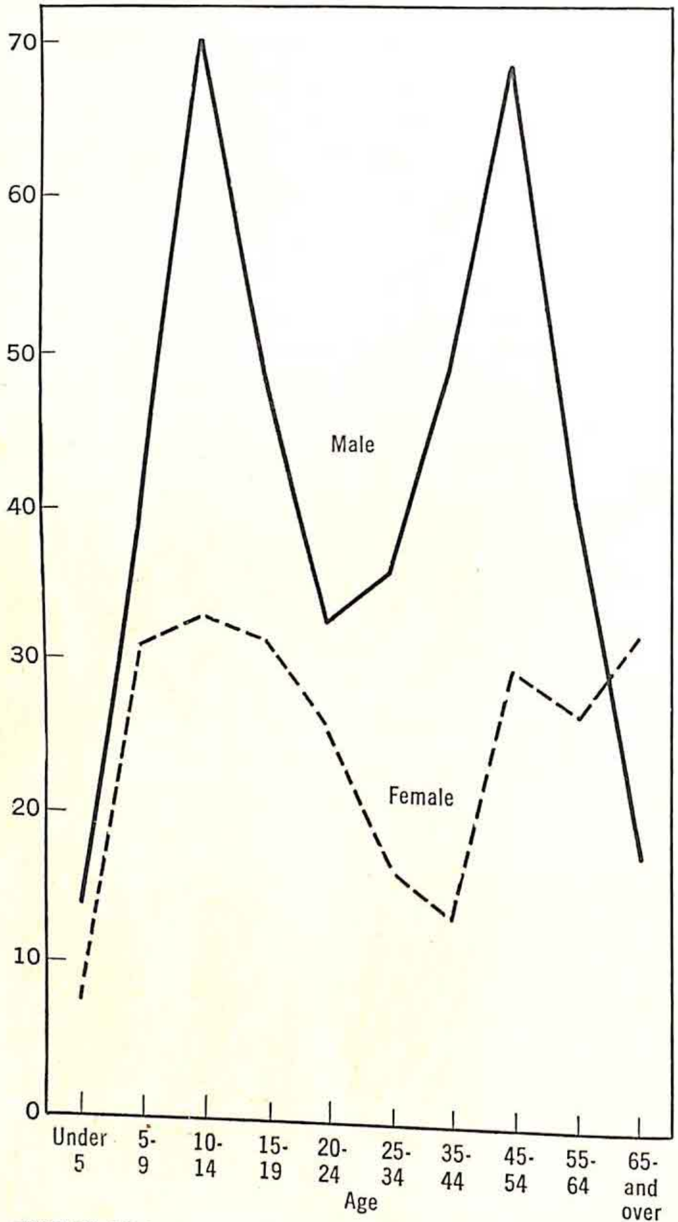

FIGURE 19-3. Annual frequency of eye refraction among surveyed persons of specific age and sex among white families

both teachers and parents are quite likely to overprotect or segregate the child, in spite of the fact that he needs the opportunity to develop socially and emotionally through group activities with his peers.

Physically crippled. The physically crippled children include those suffering from limitations due to congenital malformations, cerebral palsy, accidents, or the crippled states following poliomyelitis, encephalitis, or brain injury. These occur in wide variations ranging from a minor impairment of limb to complete paralysis or absence of such a limb. The National Society for Crippled Children and Adults estimate that there are 425,000 children between the ages of five and nineteen with orthopedic handicaps and conditions requiring plastic surgery and in addition 150,000 with cerebral palsy.

Cerebral palsy dominates the picture of the crippled the nation over. Economic or social status has no relation to this condition. About 25 per cent are generally classified as feebleminded, while another 10 per cent are seriously handicapped in learning. From a state-wide survey conducted by the New Jersey Crippled Children's Commission the following factors were observed as the major causes of educational retardation among the cerebral palsied children: lack of school opportunity, physical handicaps, and mental retardation.[11] Also a high degree of hearing and other sensory defects were found among these children, and these sensory handicaps have a harmful effect upon their learning.

Speech defects. Speech defects are quite common during the early school years, and a small percentage of these persist throughout the school years. Many of these early defects are indications of immaturity. These defects may be classed into three general groups: (1) those resulting from faulty habits, such as lisping and baby talk; (2) those resulting from emotional instability or maladjustments, which includes the stutterers; and (3) those having a definite physical basis, such as the cleft palate. However, defective hearing may cause a child to develop poor speech habits.

Lisping and baby talk constitute the largest group of speech defectives, although most of these do not persist beyond the early elementary-school years. This does not mean that children who lisp, need not be given special help. Usually the lisping can be readily improved by a teacher who understands the causes of lisping and the movements of lips, jaws, and tongue necessary for making the correct sounds. Stuttering constitutes the most serious and difficult speech disorder to be dealt with by the teacher. There are two ages when stuttering appears with a high degree of frequency. The peak of the curve of stuttering is reached when the child is about two or two and one-half years old and is just beginning to talk freely. The other period when stuttering is very pronounced is when the child first enters school. The first period is closely related to the use of language in social situations. The use of different language habits have not yet become automatic in nature. Thus, when the child is faced with social situations requiring the use of a variety of words, he is likely to become confused, and stuttering results.

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[11] J. T. McIntire, "On the Education of the Cerebral Palsied," *Journal of Educational Research*, Vol. 40 (1947), pp. 561-573.

The other period of stuttering is associated with the tension present upon reaching school when he is faced with new developmental tasks. The curve of stuttering, shown in Figure 19-4, indicates that after the first grade there is a fairly continuous decline, especially throughout the elementary-school years.[12] Although individual differences appear among children to combat emotional conditions, it seems likely that any condition which produces nervous tension is likely to set off some such emotional pattern of behavior as stuttering. Julietta Arthur reports a case which illustrates this.

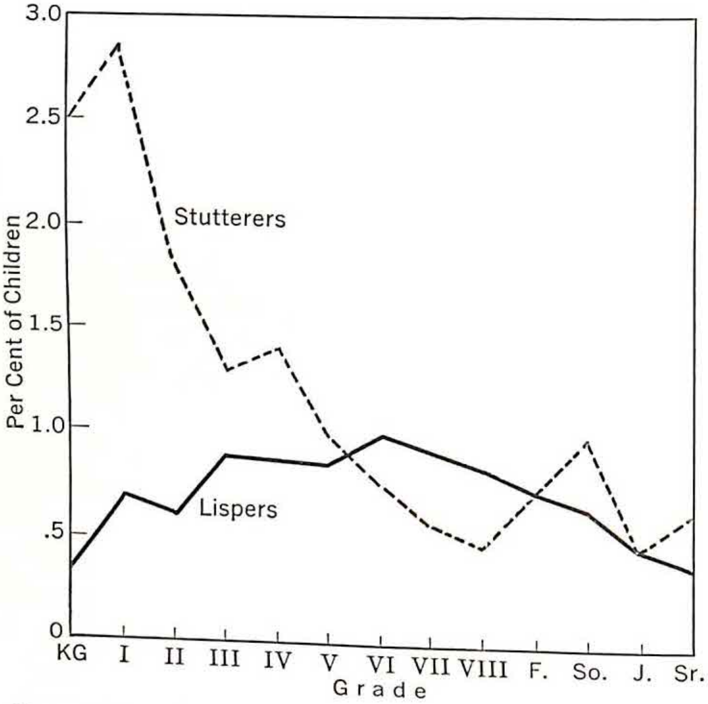

FIGURE 19-4. Grade distribution of stuttering and lisping in school

> At thirty months, David, hitherto a bright, normal child, alarmed his parents by suddenly beginning to stutter violently. After some probing, the psychologist found the "attacks" had begun after David's six-year-old cousin

[12] J. E. W. Wallin, *Clinical and Abnormal Psychology* (Boston: Houghton Mifflin Co., 1927), p. 466.

and his parents had come for a prolonged visit. In order to spare the feelings of their relatives, David's parents scolded him, not his cousin, when the inevitable disagreements arose. But David, trying to ape his older companion, found the situation to complicated for him, and his parent's apparent withdrawal and disapproval of him too bewildering.[13]

BEHAVIOR PROBLEMS AT SCHOOL

Teachers' attitudes toward behavior problems. The attitude of teachers toward behavior problems of children has been studied by a number of investigators since the well-known study by Wickman.[14] Teachers tend to rate those pupils as well adjusted in their general behavior who are doing their work at school successfully.[15] This perhaps reflects the fact that they are favorably conditioned toward successful students, with little consideration for their personal and social development. On the other hand, they are often unfavorably conditioned toward the pupil whose academic achievement is poor, with the result that the child may actually develop maladjustments in other areas or the attitudes of the teachers carry over in their estimation of the personal and social development of the pupils.

In one study teacher ratings were given to a teacher-designated problem group of over 2,100 boys and girls in grades four through eight and to a group of 12,000 children not designated as problems.[16] A comparison of the ratings given these groups revealed that problem boys were more often rated as "smart aleck," "dishonest," "disobedient," "disturbs class," "dull," "inattentive," "lack of interest," and "rude." The problem girls were more often rated as "dishonest," "dull," "inattentive," and "lack of interest." These, then, appear as traits which teachers are likely to use in designating a child as a problem case.

A distinction should be made between problem behavior which interferes with normal classroom activities and problem behavior which leads to serious personal and social maladjustments. Such a distinction was made in the study by Sparks in which a comparison was made between traits rated by one group of teachers as most detrimental to the future of the child and those rated by another group of teachers as most troublesome in the classroom.[17] The teachers were given the 55 problems from the Wickman list to rate. The ten traits rated by the teachers used in this study as most serious to the child and the ten traits rated as most troublesome to the teacher are presented in Table 19-3. It seems evident from the results of this study that teachers tend to consider those traits which are contrary to our social and moral code the most detrimental to the future adjustments of the child. While the problems rated as most serious to the future of the child are different from those regarded as most troublesome to the teacher, they are still not the problems which the mental hygienists considered most serious. A further comparison of the ratings given by different groups of teachers revealed that the amount of education appeared to make some difference in the attitudes of teachers toward the seriousness of certain behavior problems for the future of the child, although no significant difference was noted in the ranking given to the traits as most troublesome to the classroom teachers. Apparently additional training leads teachers to recognize more fully the importance of certain mental hygiene problems in the future adjustments of the child.

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[13] Julietta K. Arthur, "Help for Stutterers," *Parents Magazine* (April, 1946), pp. 153-156.

[14] E. K. Wickman, *Children's Behavior and Teachers' Attitudes* (New York: The Commonwealth Fund, 1928).

[15] See George A. Dale, "A Comparison of Two Groups of Elementary-school Children Classified for School Adjustment on a Basis of Teacher Rating," *Journal of Educational Research*, Vol. 35 (1941), pp. 241-250.

[16] Ruth Moncreiff, "A Study of Factors Relating to Problematic Behavior in Elementary School Children," *Peabody College Contributions to Education*, No. 294 (1939).

TABLE 19-3. *The ten traits rated by teachers as most serious to the child and the ten rated most troublesome*

RANK ORDER	SERIOUSNESS TO THE CHILD	TROUBLESOME TO TEACHERS
1	Stealing	Interrupting
2	Untruthfulness	Carelessness to work
3	Unreliableness	Inattention
4	Cruelty and bullying	Restlessness
5	Cheating	Silliness, smartness, etc.
6	Heterosexual activity	Whispering and note writing
7	Impertinence	Tattling
8	Impudence	Thoughtfulness
9	Selfishness	Disorderliness
10	Laziness	Inquisitiveness

Behavior problems in the classroom. It has already been suggested that maladjustments at school may find expression in a variety of ways. The pupil, when frustrated and unable to relieve his tension through normal channels, is likely to seek other outlets for the relief of his tension.[18] As the child becomes older he uses a greater variety of outlets for his aggression. Various methods are used by pupils to discharge their tension. Among these may be listed the following:

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[17] J. N. Sparks, "Teachers' Attitudes toward the Behavior Problems of Children," *Journal of Educational Psychology*, Vol. 43 (1952), pp. 284-291.

[18] See John Dollard and others, *Frustration and Aggression* (New Haven: Yale University Press, 1939).

Physical attacks on persons

Destruction of property

Verbal attacks, swearing, threatening

Combativeness, extreme competitiveness

Symbolic aggression through stories, art, and other media

Blaming one's difficulties on others

Injuring or defacing property

Negativism, arguing, etc.

The case of Frank Hammons, a sophomore at Cove High School, illustrates an outlet for a frustrated personality.

> Arriving at Cove High School on Monday morning, pupils and teachers were greeted with an odor in the halls and corridors that resembled that which comes from skunk. Further investigation revealed that this was the work of Frank, who was a general nuisance and problem at school. In his English class he spent most of his time reading comics and seldom handed in any assigned papers. In his algebra class he was failing in his work and spent most of the classtime making faces at the teacher, when she was not looking in his direction. The only scholastic interest he displayed was in science.
>
> Frank was below average in his physical development and displayed little interest in either athletics or club activities. He came from an underprivileged home and had an IQ of 94 on the *California Test of Mental Maturity*. He was in general beaten down by his teachers and received little consideration from his classmates. Frustrated in his relations with his teachers and classmates, he found a release for his feelings by entering the school building through an unlocked window and dragging a skunk through the halls and corridors of the school building.

The disparity between the needs and interests of the pupils and the demands of the school is responsible for most of the discipline problems in the elementary school. Failure in school, lack of interest in school work, and the disparity between the values and goals of the pupils and those of the teachers are important sources of trouble at the high-school level. The extent to which there is no overt behavior disorder in the classroom is not always a good measure of discipline. This is illustrated in the following example:

> Teacher Z was placed in charge of the seventh-grade group which had a reputation of being disorderly and unruly. The first act of teacher Z was to

The typical classroom will often include children from each of these categories. The mentally gifted child finds the ordinary tasks at school easy to perform. He may display impatience at the slow learning and lack of insight of his less able classmates. Studies show, however, that the picture of the gifted child as a weakling and one-sided in his development is a false one. The mentally retarded child, on the other hand, finds most of the school work too difficult. He becomes discouraged and may develop feelings of inferiority as a result of his constant failures at school. Studies show that low intelligence is more likely to lead to maladjustment at school and at home than in the community. This results from the premium that the school, in particular, places on performances requiring average or above average intelligence.

Physical handicaps present barriers to adjustment, since they limit in some manner the individual's range of activities. However, the extent to which these handicaps produce maladjustments will depend largely upon the attitudes taken by teachers, parents, and classmates toward the particular individual and his physical handicap. The physically handicapped include the visually defective, hard-of-hearing, crippled, spastic, cardiopathic, speech defective, and those suffering from any other disabling condition. The three groups frequently found in the classroom and discussed in this chapter are: (1) sensory defects, (2) crippled, and (3) speech difficulties.

Behavior problems of varying degrees will be found in the typical classroom. Studies show that those activities often regarded as most serious by teachers are looked upon by mental hygienists as less serious in nature. The three traits listed by teachers as most serious to the child's future are (1) stealing, (2) untruthfulness, and (3) unreliableness; while the three listed as most troublesome are (1) interrupting, (2) carelessness in work, and (3) inattention. Classroom disturbances are the problems most frequently encountered by teachers. This is to be expected, since they tend to interfere most seriously with classroom activities. Poor work habits, nail-biting or thumb-sucking, lack of self-confidence, nervousness, and social immaturity are behavior and personality traits frequently found in the case histories of discipline problems.

Questions and Exercises

1. Cite some case from your own observations of maladjustment resulting from school failure. Show how maladjustment may result in school failure.
2. Contrast the learning characteristics of the bright and slow-learning pupil. What is the educational significance of these differences? Show how these differences would affect the methods of teaching bright and slow-learning pupils.
3. What are some of the special adjustment problems of the physically handicapped child? Show how some of these are met by a modern school program.
4. What are some of the characteristics of a well-adjusted twelve-year-old boy or girl? Differentiate the well-adjusted personality from the balanced personality.
5. What are the major classroom behavior problems which you have observed in some recent classroom observation? How do these tend to vary with different age groups?
6. Cite one or more cases of individuals who presented classroom behavior problems. How would you account for such behavior on their part. Why is it important for the teacher to have a clear understanding of the home and neighborhood background of the child who presents a problem in the classroom?
7. Observe the children in some typical elementary-school grade. What different kinds of exceptional children are found in this grade?
8. Examine a recent issue of *The Journal of Exceptional Children* and make a report based upon materials found in the journal.
9. How would you account for the differences in the ratings given to behavior problems by mental hygienists and teachers? Note especially the differences in the study by Wickman referred to in this chapter.

Recommended Readings

The Education of Exceptional Children. Forty-ninth Yearbook of the National Society for the Study of Education (Chicago: University of Chicago Press, 1950).

Garrison, Karl C., *Psychology of Exceptional Children,* rev. ed. (New York: Ronald Press, 1950).

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: The Macmillan Co., 1948), Chap. XX.

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Louttit, C. M., *Clinical Psychology* (New York: Harper and Bros., 1947).

Rivlin, H. N., *Educating for Adjustment* (New York: Appleton-Century-Crofts, Inc., 1936).

Skinner, Chas. E., ed., *Educational Psychology*, 3rd ed. (Prentice-Hall, Inc., 1951), Chaps. XXI and XXII.

Trow, William C., *Educational Psychology*, 2nd ed. (Boston: Houghton Mifflin Co., 1951), Chap. XIX.

Wallin, J. E. W., *Personality Maladjustments and Mental Hygiene*, rev. ed. (New York: McGraw-Hill Book Co., 1949).

CHAPTER 20

Guiding the Individual Child

THE NATURE AND IMPORTANCE OF GUIDANCE

THE TERM GUIDANCE is sometimes a confusing one, since it means different things to different people. To some it means giving advice, to others it means directing the individual in the solution of his problems, while to others it means testing. Some regard this as special services performed by a specialist, while others look upon it as synonomous with good teaching. Actually guidance embraces all of these. It is a point of view closely identified with the democratic concept of the worth and dignity of each individual. When this viewpoint is combined with our knowledge of individual differences we have the framework for a sound guidance program. In such a case guidance becomes a function of all teachers, counselors, specialists, and school administrators. All of these have their own unique functions to perform. However, the teacher remains the central figure in the educational guidance of the child. He yields a continuous influence upon him throughout the school year. He exerts both directly and indirectly his influence on all the children.

The scope of guidance. There is a tendency of many students of educational psychology to identify guidance services with the junior- and senior-high school. However, some of the most effective guidance has been found in superior one-room schools. In such a school the teacher becomes well acquainted with each pupil's background and special needs and problems. The pupils are guided in their growth in learning to live, study, and play with individuals of all age levels. Thus, the one-room school often presents a splendid opportunity for the guidance of pupils in their personal and social relations with individuals of different age and maturity levels.

The modern school program regards guidance as broad in scope as the school program itself. Many states have adopted certification standards for elementary- and secondary-school counselors.[1] There is a pronounced trend to provide more training for teachers in guidance procedures along with trained counselors as part of the school personnel.[2] Guidance is not something new which has been introduced into the school program. Teachers at all periods have used various guidance techniques to some degree, and have been concerned with educational, health, personal, social, and vocational problems of the pupils.

Guidance and teaching. The words guidance and teaching cannot be clearly separated. Teaching was defined in an earlier chapter as the process of guiding and stimulating individuals in their growth and learning. Needless to say, such guidance will vary with the intelligence, maturity, and experiences of the individuals concerned. During the early years of life, the child will need considerable guidance. As he develops he should be guided in his development toward independence and self-directed behavior. The relationship between the amount of self-directed behavior which may be expected of a child and intelligence is graphically presented in Figure 20-1. The first-grade child with an IQ of 120 should be able to comprehend the nature of a situation far better than a first grader with an IQ of 85. The child with superior intelligence is able to judge the consequences of certain types of behavior and is thus mentally mature enough to assume responsibilities that cannot be expected of average and below average children. However, such a child will not automatically assume such responsibilities. The extent to which a child will assume responsibilities for his own actions will also depend upon his past experiences in self-direction.

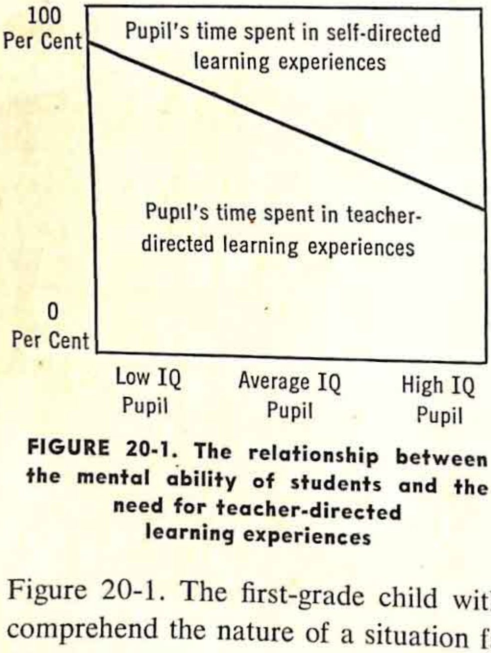

FIGURE 20-1. The relationship between the mental ability of students and the need for teacher-directed learning experiences

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[1] Clifford P. Froehlich, "Is Counseling Becoming a Profession?" *School Life*, Vol. 32 (1950), p. 5.

[2] Arthur E. Traxler, "Emerging Trends in Guidance," *School Review*, Vol. 58, (1950), pp. 14-23.

Habits of self-direction develop gradually out of experiences in assuming responsibilities related to one's behavior.

A study by Sakamoto was conducted with the type of guidance used with the children at the University of Georgia Nursery School.[3] This is an excellent all-day nursery school under the general supervision of the School of Home economics of the University. Careful observations were made of individual children on different occasions. During the course of the study twenty children were observed. The types of guidance techniques used and the frequency of use of each technique are presented in Table 20-1. Suggestion and assistance techniques, methods recommended by students of child development, were most frequently used in both indoor and outdoor activities. The command type of guidance was most frequently used with the two-year-olds and least frequently used with the five-year-olds. This is to be expected, since the two-year-olds are more immature and more dependent than the five-year-olds. On the other hand, explanation was more frequently used with the five-year-olds; however in all age groups suggestion was the most frequently used type of guidance. Praise as a means of motivating and guiding nursery school children was most frequently used indoors, where the children were independently engaged in different types of activities.

TABLE 20-1. *Frequency of occurrence and percentage of types of guidance used with nursery-school children in their indoor and outdoor activities*

TYPES OF GUIDANCE	INDOORS FREQUENCY OF OCCURRENCE	INDOORS PERCENTAGE	OUTDOORS FREQUENCY OF OCCURRENCE	OUTDOORS PERCENTAGE
Suggestion	284	32.0	68	37.5
Assistance	188	21.3	42	23.1
Command	138	15.6	30	16.5
Praise	81	9.4	6	3.3
Explanation	62	7.0	12	6.6
Request	53	6.0	15	8.3
Encouragement	29	3.2	4	2.2
Approval	25	2.8	2	1.1
Substitution	8	0.9	1	0.6
Watching	8	0.9	1	0.6
Ignoring	8	0.9	0	0.0
Total	844	100.0	181	99.8

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[3] Tsuyako Sakamoto, "Adult Guidance Techniques Used in Free Play Activities at the University of Georgia Nursery School," Master of Science Thesis (University of Georgia, 1952).

Vocational counseling. Adolescent boys and girls enter high school without much concern about their future vocational plans. However, the problem of choosing a vocation from the great variety of opportunities today presents a vital problem to them when they leave school and enter the world of work. The problem of choosing a vocation is a more difficult one today than it was during the past centuries. Some of the major differences may be listed as follows:

1. There is a much greater variety of jobs to choose from today than ever before.
2. Various kinds of work are more highly specialized, requiring special characteristics and skills.
3. The world of work has grown more complex, in harmony with the growing complexity of our social and economic order.
4. Individuals are seldom placed in a specialized job after a long period of of apprentice training, but rather through interviews, tests, and other means of evaluation in the personnel office of a business or industry or profession.

Vocational guidance is one of the most important areas of guidance at the secondary-school level. It is here that a trained counselor is very important. There is evidence that when youth are given sound guidance that they are more realistic in their occupational choices. When they have had work experiences they are better able to adjust to their initial job. The counselor should know the job opportunities and the abilities and skills required of them. In addition, he needs to guide boys and girls in becoming better acquainted with the nature and requirements of these different jobs. A second function of the vocational counselor is to help boys and girls evaluate their own abilities, needs, interests, and aspirations. If these boys and girls are to make sound vocational decisions they must study their own abilities and interests in relation to job requirements. A third function of the counselor is to help boys and girls set up aspirations and goals that are realistic, that is, goals which are in harmony with their characteristics and that can likely be attained. In this connection, it has been suggested by Havighurst that the tasks of the vocational counselor are:

1. To help pupils decide whether they should make a try for upward social mobility.
2. To help a minority of pupils achieve upward social mobility.
3. To help the majority of pupils enjoy social stability. This means helping them to work out a school program that will make them skillful and

United States Public Health Service

Individual tests are useful in the guidance of the individual child

happy workers at the occupational level of their fathers, and also helping them to develop extracurricular interests, such as music, dramatics, athletics, which will carry over into adult life and help them to enjoy their leisure time.

4. To interpret cultural differences to teachers. . . .[4]

FUNDAMENTALS OF GUIDANCE

The importance of guidance in the modern school program has been emphasized throughout our discussion of growth, development, and learning. It might be stated that the keystone of the school program is guidance—helping boys and girls to solve their problems more adequately and reach sounder decisions about education, vocations, and various kinds of personal and social problems. There are some essentials of guidance services which are applicable to all grade levels. A study of these will provide a basis for interpreting and evaluating guidance practices frequently encountered in our schools.

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[4] Robert J. Havighurst, "Implications of Cultural Differences for Guidance in the Secondary Schools," *Studies in Higher Education* (Purdue University, Division of Educational Research, 1949), Vol. 69, p. 30.

Objectives. If the classroom teacher is to be effective in her teaching and guidance she must have a good understanding of the purposes of education and the nature of child development. At all stages of the child's growth and learning guidance and instruction must be in harmony with his maturational level. It was pointed out in Chapter 10 that failure and frustrations are normal features of life. It is important for individuals to acquire desirable ways of meeting frustrations. Thus, the school should help the individual gain a better understanding of his capabilities and limitations. The classroom teacher needs a clear understanding of the purposes of guidance in order that she might direct her activities better toward helping boys and girls meet and solve their problems in a satisfactory manner.

Evaluation growth. Since a sound guidance program should be based on a good understanding of the individual pupil, a good evaluation program becomes an essential. A test of intelligence or scholastic aptitude should be given periodically to each individual child. Reading readiness tests may be most important at the time the child enters the first grade, and standard reading tests should be given periodically thereafter. It is highly desirable to administer a general achievement test, which might include a good reading test.

Too often teachers have been concerned about getting the child's IQ and using this as a "determiner" for all school problems. The IQ is only one of many facets by means of which the child should be judged. The teacher should make use of many other facets to get an evaluation of the whole child. Secondly, the teacher should realize the difference between *potential* ability and *manifest* ability as measured by the intelligence test. Since intelligence tests measure manifest ability one may find that two children with equal scores on an intelligence test have very different potential abilities.

The interests and personality characteristics of the pupils may be evaluated by means of inventories, rating scales, anecdotal records, or other available techniques. Such data can usually best be secured by the individual teacher. The securing of such data should be the responsibility of every teacher, but should be carefully planned so as not to be too complex or to require too much detailed work.

Cumulative records. A third essential for a well-organized guidance program is an up-to-date cumulative record that is complete and at the same time usable. Such a record consumes time on the part of the teachers and others; however, achievement, interests, and personality data obtained over a number of years will give a clearer picture of the whole child than any other means available. Such a record should contain the results of tests given along with the date of each of the tests. Teachers marks or evaluations, descriptions of the pupil's home and community background and activities, noteworthy achievements at school both in class and out-of-class activities, health record, and the general aspirations and problems of the pupil should be included on the cumulative record.

The comprehensive concept of education requires a consideration of out-of-school social, recreational, and work activities. Information useful for instructional and guidance purposes that should be included in the cumulative record, have been listed by Dugan as follows: [5]

Areas of Information	*Means of Appraisal*
1. Scholastic aptitude	Previous grades, psychological tests of ability and achievement.
2. Scholastic achievement and basic skills	Previous grades, standardized and teacher-made achievement tests, survey and diagnostic tests of basic skills, school activities, and work experience.
3. Special abilities; clerical, mathematical, artistic, and the like.	Special aptitude tests, interviews, evaluation of previous achievement or performance (work experience, hobbies, extracurricular activities.)
4. Interest and plans	Autobiographies, interest inventories or tests, stated interests, interviews, previous achievements, and both work and leisure activities.
5. Health and physical status	Physical examination, health history, observation, attendance record and nurse follow-up, and family consultation.
6. Home and family relationships.	Observation, anecdotes, rating scales, interviews, autobiographies, themes, checklists and adjustment inventories, reports from employers, group workers or group leaders, and parent conferences.
7. Emotional stability and social adjustment	

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[5] Willis E. Dugan, "Counseling in the Modern Secondary-school Program," *Bulletin of the National Association of Secondary-School Principals*, Vol. 35 (1951), p. 15.

TABLE 20-2. *Types of special services provided by one department of special education*

TYPES OF TRAINING	PUPILS	TEACHERS
2 schools for the deaf and hard of hearing	300	38
2 schools for crippled children	600	38
1 school for epileptic children	177	11
12 open air schools	860	35
50 open window classes in elementary schools	1,239	51
74 classes for mental retardates, 6-12 years of age	1,510	73
12 boys' and 8 girls' centers for pupils 13-16 years of age (retardates)	1,915	97
3 observational schools for maladjusted older boys	596	38
11 junior ungraded classes for boys under 12	205	11
51 lip-reading classes (part time)	439	3
167 speech correction classes (part time)	7,452	43
4 centers for children not able to speak English	230	9
Educational program in the city's Detention Home (under Juvenile Court)	100 to 300	9
Boytown Camp for problem boys	Variable	

given part-time instruction in speech correction and lip-reading classes.[7] The program for the various types of handicapped children should be adapted to the needs and problems of the group. It should be sufficiently flexible to provide for the fullest personal and social development of the individual, with a special effort made to satisfy his need for feelings of adequacy and security.

Special classes. There were in 1948, 378,059 children who because of a marked deviation from the normal were receiving instruction in special day schools or classes, in the hospital, or at home.[8] There are in addition 63,761 children in 454 public and private residential schools as of 1947. This gives a total of 441,820, but represents only about 11 per cent of the estimated number of exceptional children for whom special educational efforts should be made. There were 16,234 teachers employed to serve these children, 10,308 of whom were in day schools and 5,926 residential schools. With the increased attention being given to child care, there will be an increase in the facilities for training handicapped children. This will call for an additional number of trained teachers in special schools and in connection with the regular school program.

The role of a specialist. Teachers are expected to guide children in finding a satisfactory solution to most of their problems encountered at school.

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[7] Anna M. Engel and Harry J. Baker, "Socially Maladjusted Children in a City School System," *Journal of Educational Research,* Vol. 40 (1946-47), pp. 615-627.

[8] "Statistics of Special School and Classes for Exceptional Children, 1947-48," *Biennial Survey of Education in the United States, 1946-48* (U. S. Office of Education).

They should also be able to recognize the serious problems which appear among a small percentage of pupils. The question may be raised: when should the teacher seek help from a specialist? A second question closely related to this is: Where can such help be obtained? The answer to these questions will depend in a large measure upon the nature of the community in which the teacher is employed and the school health system. However, in no case should a teacher be expected to do the work of a clinical psychologist in dealing with serious behavior problems or in the diagnosis of educational difficulties of a complex nature.

In a community where there is a well-developed guidance clinic, and a staff of social workers, the teacher's job more often becomes one of referral and co-ordinating the efforts of the schools with those of individuals and agencies especially concerned with child welfare and development. For example, if the child seems to be unable to learn the teacher will refer the child to the school psychologist rather than attempt to diagnose the difficulty himself. This leaves the teacher more time for her teaching and related activities. The function of the school psychologist, social worker, and guidance clinic should be clearly understood by the teacher. However, teachers and parents should realize that these agencies do not perform miracles. The problems of retraining and remedial work are difficult and usually time-consuming. The best results are attained when the efforts of all concerned are co-ordinated toward fairly well-defined goals. The case of Joseph which was brought to the writer's attention illustrates such an effort.

Joseph was seven years old and in the second grade, although he was a very poor reader. The chief characteristic which brought Joseph to the attention of the guidance clinic was his antisocial nature. He was unable to work satisfactorily with a group. When he did not get his way about something he would put on an unusual display of conduct, often rolling on the floor or biting his pencil or book.

The teacher referred Joseph to the school psychologist who found him to have an IQ of 105 on the *Stanford Revision of the Binet Tests*. The health record showed that he was in general, underweight. Also, his health history indicated that he had not been very healthy since he had measles when he was a little more than three years old. The school psychologist suggested that he be referred to the guidance clinic. The guidance clinic consulted the parents and found that Joseph displayed similar antisocial forms of behavior at home under emotional stress. By this method he had been able to win his point with his parents and two older sisters.

Through continued efforts of the clinic working with parents and teachers considerable improvement has been noted in the behavior of Joseph. However, in the third grade, he was still not able to work smoothly with a group. In this case, however, he withdrew from the group in a bad mood when things did not go according to his liking. Through the remedial reading program he has grown considerably in his reading ability. This offers some hope for him. However, unless careful guidance is continued he is likely to seek refuge in daydreaming, excessive reading or other withdrawal activities when he is frustrated in working with others.

Clinical services. Although most of the problems encountered at school can be best handled by the classroom teachers, there are more difficult and complex problems which require the services of a specialist. It is furthermore recognized that most problems develop out of a multiplicity of factors and conditions in the individual's hereditary make-up and past experiences. Thus, clinical services have been established to identify, study, and prescribe the treatment needed by such cases. Specifically this includes:

1. Identifying pupils having defects of reading, hearing, vision, speech, and other defects and disabilities.
2. Co-operate in the analyses of conditions and factors contributing to personality maladjustments, educational disabilities, and problems involving physical and mental health.
3. Co-ordinate and interpret recommendations from clinical studies to pupils, teachers, counselors, parents, and others concerned with the guidance of individual pupils.
4. Follow-up special recommendations and arrange for further examinations and studies when needed.
5. Conduct research and make recommendations on the clinical needs of the school.

Guiding the superior pupil. The needs of the superior pupil are similar to those for the inferior and average; however methods of meeting these needs are not the same. Teachers should know the learning characteristics of superior children and adjust their methods and the curricula materials in harmony with these characteristics. Studies show that the class time of superior students in such regular classes as algebra can be reduced at least fifteen per cent without injury to learning the materials included in the basic course of study.[9] This extra time can well be spent in an enrichment program.

There are many gifted children whose educational aspirations are far below their capabilities. The superior child should understand his capabilities and should be guided in setting goals in harmony with his abilities. Failure to do this leads to personal maladjustments and a waste of human resources.

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[9] Mary E. Albers and May V. Seagoe, "Enrichment for Superior Students in Algebra Classes," *Journal of Educational Research*, Vol. 40 (1946-47), pp. 481-495.

Teachers of superior students should realize that such students readily recognize cues and suggestions set forth. They may be motivated by indirect procedures and will do more than the prescribed assignment when the suggestion is offered to them in an indirect manner. Independent reading and study should be one of the many activities stimulated by all teachers. This may be successfully done in the English class by having each student plan with the teacher his own individual list of books for reading. The students will in such a case tend to set forth reading goals in harmony with their willingness to do the assignment and their capabilities. In social studies the students should be guided in planning programs of work including special problems or topics which they will study during a particular period. The success of such a procedure will depend upon (1) the amount of freedom given the student in planning his activities; (2) the nature of guidance offered; (3) the extent to which this is continuously followed up; and (4) the procedures used in evaluating outcomes.

There are many opportunities in every classroom for creative expression. The mathematics teacher may note the interests of a gifted student in using certain principles learned in mathematics in a construction project at home or in the community. The slant of the roof, the distribution of supports, the use of various tools all embody mathematical principles. The science teacher will find almost every principle of science taught in high school illustrated in problems around the home and school. The gifted child who is encouraged to make use of materials from his daily living in his science work, will constantly find creative expression a means of expressing various facts and principles encountered in the classroom.

Guiding the mentally retarded. There is a growing tendency to organize our educational program to suit the needs and conditions confronting the pupils, rather than compelling them to conform to some rigid system designed and controlled by standards. Educational provisions for the mentally retarded child should have the following objectives: (1) to help him understand his abilities and limitations and to guide him in the development of his abilities; (2) to teach him to live happily with himself and others; (3) to develop in him the attitudes, ideals, and habits of emotional control necessary for adequate social adjustment; (4) to help him cultivate an interest in a wide variety of things which he will encounter in his daily living—friends, nature, sports, music, and the like; and (5) to develop in him the desire to be of service to his classmates and others.

The educational development of the mentally retarded child follows the same general pattern as that of the average child; however he needs more time to learn new materials at the different stages of his development. He needs more first-hand experiences with things about him before beginning his reading and should not be expected to grasp new ideas, recognize differences in words as quickly as the average and superior child, or see relationships readily. The relationship between his reading material and his everyday activities must be more direct, if he is to grow in reading ability. Thus, the teacher will need to include more immediately useful concrete words in his reading and must resort to drill to a greater degree. The distribution of practice has been found to be more effective for dull and average children than massed practice in the learning of simple sensori-motor skills or the recall of small units of discrete memory material.[10] However, the major determinant in the effectiveness of learning for mentally retarded children is individual aptitude rather than method of learning.

Holding the poor student back was a common practice of the traditional American school. The general notion prevailed that by repeating the grade the pupil would be able to learn the materials that he failed to learn earlier. Such a notion has not found support in studies bearing on this problem. The repeater often learns very little and becomes a troublemaker when kept with younger children. The increased emphasis upon the education of the whole person and on good personal and social adjustments has led to a nonfailure policy among many schools. Such a policy recognizes that a pupil who does poor work in the second grade is perhaps more like the second-graders that are being promoted into the third grade than like the oncoming second-graders, in every respect of his development except his school performances or academic work. However, the poor second-grader who has done poor work in reading, arithmetic, and spelling will have considerable difficulty if he is promoted to the third grade. A study by Goodlad dealt with this problem, using unsuccessful first-graders as subjects.[11] One-half of the unsuccessful students were held back while another one-half was promoted into the second grade, he found that both groups were maladjusted during the following year, with both groups having trouble with their schoolwork. Also, members of both groups showed lack of self-confidence and were poorly accepted by their classmates.

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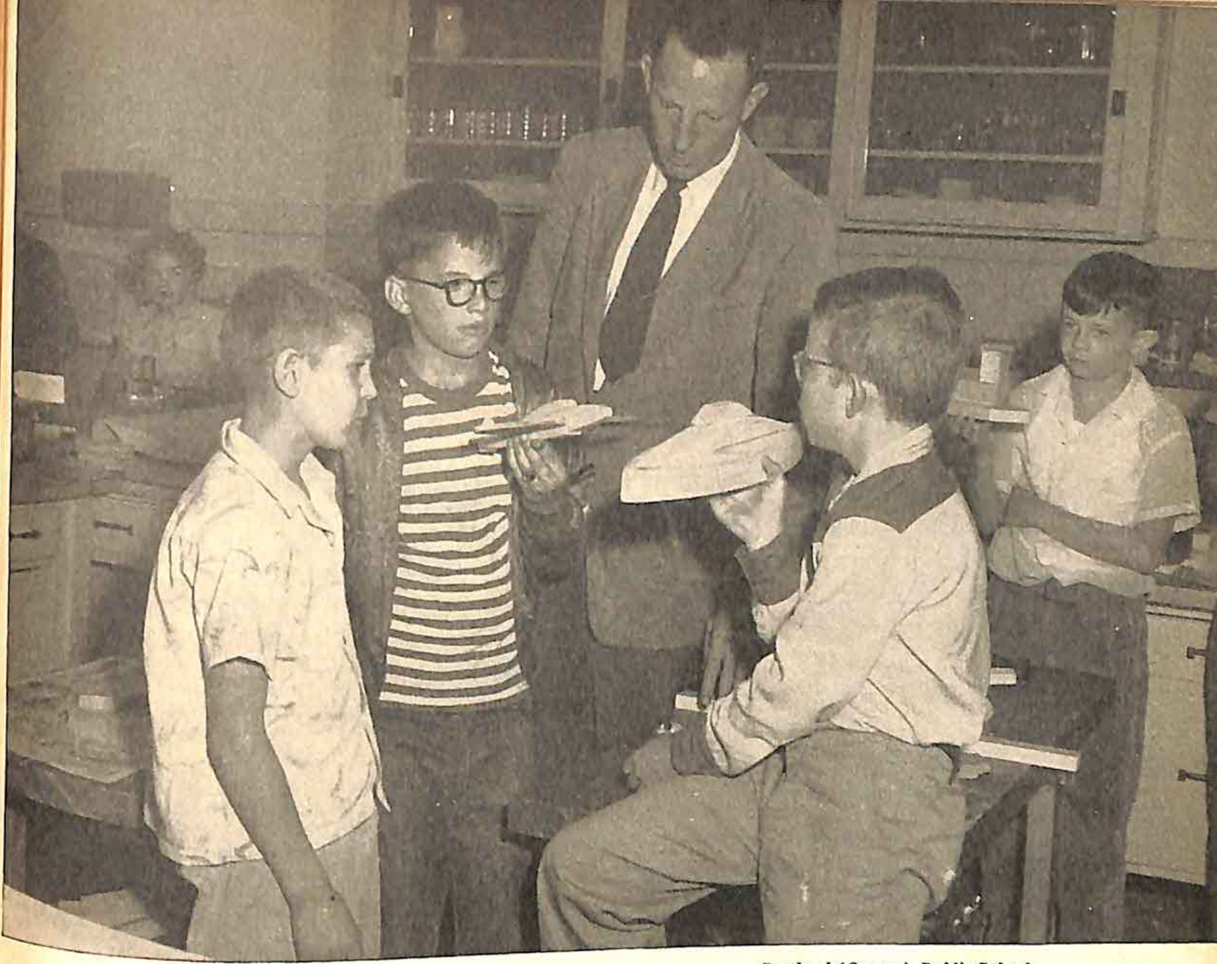
[10] John L. Meadows, *Effectiveness of Distributed and Massed Learning for Children of Varying Intelligence* (George Peabody College, Contributions to Education, 1941).

[11] John I. Goodlad, "Research and Theory Regarding Promotion and Non-promotion," *Elementary School Journal*, Vol. 53 (1952), pp. 150-155.



Portland (Oregon) Public Schools

The retarded learner develops best through guidance which leads to successful experiences

Since nonpromotion tends to brand the child as a failure, and tends to upset any social adjustments that may have been made with his classmates of the same age level, it appears that the net advantage lies with promotion. Unless there are good reasons to believe that holding the child back will better provide for his total development than will promotion, the policy of social promotion should be followed. The mentally retarded children will be unable to do satisfactory academic work in school; however they will gain satisfaction from activities which they can do with a reasonable degree of success. Sometimes they are able to reach a fairly high degree of success in certain types of manual education. There are some who may find satisfaction through certain phases of the school program other than the regular class work. The problem of vocational guidance for them is simplified by the fact that many vocations are not open to them because of their limitations. There are, however, many jobs that do not require a high degree of mental alertness or vocational skill into which they should be guided.

Guiding the physically handicapped child. Guidance for the physically handicapped child must take into consideration the unique qualities of the individual. Variations from person to person are very wide among the handicapped. In many respects a physically handicapped group is less homogeneous than a group of persons who are free from marked handicaps. Therefore, it becomes evident that a careful diagnostic study which reveals the individuals' unique qualities is highly important for adequate guidance of handicapped persons. Concerning this problem, Finch and Yowell state:

> It would be disastrous to base guidance practice for the physically handicapped persons upon the false assumption that there is some common "psychology of the physically handicapped" in the sense that similar physical conditions produce or are accompanied by similar psychological traits. The school which assumes that gross physical condition affords an index of the individual's psychological problems risks misunderstanding a very large share of all the children it serves.[12]

Complete guidance service for the physically handicapped would make provisions for aiding the individual in understanding himself and for developing in that individual interests and goals which are not only socially acceptable, but also consistent with his potential capacity for learning and development. Furthermore, the physically handicapped person needs to be guided in acquiring such information about his social and physical environment which he will need as a basis for making sound decisions.

Important factors which the teacher of handicapped children should consider, if there is to be a meaningful educational program have been listed by Cain as follows:

1. Develop an awareness for symptoms that are indicative of handicaps. Remember that handicaps are often multiple and that symptoms seemingly indicative of one condition may actually be caused by a related disability. For example, a child who appears to be mentally retarded may have a hearing loss.
2. Be aware that a physical or mental handicap is often accompanied by a social handicap. Such children may experience rejection or overprotection at home and such should be avoided at school.
3. Maximize the likeness of the handicapped child to those of his peer group by emphasizing his assets. Develop a positive philosophy by showing that all individuals have some handicap to which they must adjust.

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[12] *The Forty-ninth Yearbook of the National Society for the Study of Education*, Part II, *The Education of Exceptional Children* (Chicago: University of Chicago Press, 1950).

4. Provide sufficient freedom for the handicapped child to work out problems in terms of his own limitations.
5. Encourage the handicapped child toward possible vocational goals within the limits of his abilities.
6. Work for adequate diagnostic and treatment facilities within the community and state. Remember that such facilities will not be provided unless they have community support.
7. Work for an educational program within the school system that follows through with the handicapped child. A good program in the elementary school can be largely negated by making no provision for special programs at the secondary level.
8. Evaluate the accomplishments of the handicapped child in terms of what is useful to him and not in terms of arbitrary standards which may be unattainable.[13]

DISCIPLINE AND GUIDANCE

The aspirations and needs of the individual child should not be overlooked in his educational program. However, the nature of our social order is such that these cannot be allowed complete freedom. The development of the democratic concept has been an important force in the removal of the repressive practices and the substitution of guidance in our educational practices. While it appears that some drives must to a large degree be repressed, there are many for which a desirable outlet should be found. This is in essence the true meaning of guidance.

Discipline and control. Discipline should not be confused with an authoritarian attitude. However, the child must learn that there are preferred ways of doing things. These can best be taught through example and guidance. If authority and discipline are experienced in an unpleasant manner, and as something which arouse fear, anxiety, and anger the individual's social development will be hampered. In such a case a hostile attitude is developed toward authority and the individual concerned will display a nonco-operative and resentful attitude toward those who attempt to direct his activities, As a result the individual develops a resentment against rules and regulations, and he may develop a defensive method of responding to them. This may take the form of refusal to follow directions, aggressiveness toward others, or a general suspicion and distrust of the motives of others. The case of Tommie is somewhat typical of such behavior.[14]

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[13] Leo F. Cain, "The Teacher and the Handicapped Child," *Education,* Vol. 69 (1948-49), p. 279.

> Tommie, a Negro boy, aged eight, had been placed in four foster homes. He complained constantly of how he was treated by other children and by his foster parents and of the attitude of the teachers toward him. He believed that all adults discriminated against him; that teachers failed to promote him because he did not come from a prominent family; and that every one "picked on him." He refused to cooperate in discussing his problems with the caseworker, and insisted that some way be found by which he could live with his father, who had divorced his mother and remarried. His aggressive, suspicious behavior showed markedly when he was with children of his own age. Fighting and threatening them was his only means of gaining his "associates' attention."

A large percentage of teachers went to school themselves in a rather formal classroom atmosphere. Such teachers often find it difficult to adjust to the freer democratic classroom atmosphere of the modern school. Also, teachers who lack self-confidence and the feeling of security which accompanies it are hesitant about allowing the children the freedom found in the democratic classroom. It should be pointed out, however, that there is a marked difference between controlled behavior achieved through self-discipline and a *laissez faire* policy that permits children to do as they please.

Learning self-control. Modern life calls for indivduals who are able to follow directions but at the same time make their own choices. In a regimented program where the teacher makes all the decisions and directs the activities of the pupils in specific directions through dictatorial procedures, little opportunity is provided the pupils for growth in self-control and self-direction.

Children have within themselves the potentials for self-control and self-direction; however these will not ripen as a result of maturation alone. In harmony with the principles of learning set forth in Chapters 11 and 12, children must be given the opportunities to practice self-control. Needless to say, the teacher should guide the child in his growth and development, but such guidance should not be one of constant direction. The task of guiding children in the development of habits of responsibility and self-discipline is perhaps the most significant of all in the preparation of citizens for a democratic society.

The development of moral character of a group of children was studied by Havighurst and others at the University of Chicago over a period of eight years.[15] These children were observed from the time they were nine or ten years old until they were seventeen or eighteen years of age. At the end of this period of study ratings were made on the moral development of these children. These were then compared with different facts about these boys and girls. The relation of severity and consistency of discipline to good character development was studied. It was noted that severity of discipline bore no relation to character development. Some of the children who had been severely disciplined had good character while others had poor character. Likewise, some of the children who had been very lightly disciplined had good character while others had poor character.

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[14] Hortense S. Cochrane, "Emotional Aspects of Social Adjustment for the Child," *Mental Hygiene,* Vol. 32 (1948), pp. 586-595.

In the case of consistency of discipline they found a close relationship with character. The coefficient of correlation obtained between character ratings and consistency of discipline was .62. This was one of the most closely related variables to character studied. It appears that discipline can be successful or unsuccessful, depending largely upon the spirit in which it is administered and the consistency of parents in administering it.

Discipline and group dynamics. Teachers at all grade levels are concerned with problems of adjustment in the classroom. This concern, in many instances, revolves around means of dealing with so-called problems of behavior. What to do with the boisterous or inattentive pupil, and so on. The guidance given must be viewed within a broad framework, which includes the characteristics and needs of the individual child and the goals of the school. A diagnostic, creative approach to the behavior problems encountered in classroom living should be employed. The individual child should be viewed as a functioning member of the group. The dynamics of the group becomes important in dealing with classroom behavior problems. It has been suggested that the interpersonal relationships of the members of the group are "more fundamental in motivational patterns than are specific teaching devices." [16] Children must experience a reasonable amount of freedom to be themselves and to express themslves according to certain acceptable standards. Any disciplinarian devices that fail to take into consideration the dynamics of the group along with the individuality of the members of the group is doomed to failure.

The development and use of sociometric devices have led to an increased recognition of the effects of the child's position in the social group on his behavior and growth. These devices do not reveal the "why" of certain behavior friendship patterns. Information about the home background, abilities, and interests and needs of an individual child will be useful to the teacher in helping those children in need of special attention and guidance. This does not mean that all children should be encouraged to become active leaders or to actively participate in all the activities of the group. Some children, because of their background, interests, abilities, and personality make-up will prefer to be actively engaged in some group pursuits while they are "fringers" in others. At this point the teacher should distinguish between a well-adjusted personality and a so-called well-balanced personality which may mean a common personality mold. The well-adjusted personality has developed desirable methods of meeting frustrations. The well-balanced personality is one that has a wide range of interests and pursues a wide range of activities. An over-emphasis on the development of well-balanced personalities might lead to frustrations and mediocrity in all activities for many pupils.

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[15] Robert J. Havighurst, "The Functions of Successful Discipline," *Understanding the Child*, Vol. 21 (1952), pp. 35-44.

[16] Fritz Redl and William W. Wattenberg, *Mental Hygiene in Teaching* (New York: Harcourt, Brace and Co., 1951), p. 65.

Desirable practices. An evaluation of the effectiveness of certain discipline practices should be based upon the extent to which it fulfills its major functions—the guidance of pupils in desirable social and personal development. It should be recognized, however, that the activities of a single pupil should not be allowed to interfere with the desirable development of other pupils. It is at this point that the pupil must be taught his responsibilities as a member of the social group. In out-of-school activities playmates and peers are usually most effective in forcing individual members of the group to conform with the standards of the group.

Too often discipline in the classroom is concerned with procedures for compelling the pupils to act in certain prescribed ways dictated by the teacher with little consideration for the effects upon the particular pupil of the method used. Any disciplinary measure should be considered in terms of the effects of the discipline (1) upon the individual concerned, and (2) the effects of the discipline upon the attitudes and learning of the members of the group.

It was pointed out in Chapter 12 that in general praise and reward are superior to reproof and punishment as motivating devices. Any use of punishment should be based upon a careful analysis of the problems and needs of the individual child. Parents may within narrow limits administer punishments as a means of releasing their own aggression, providing they give the child much affection. Even at this point consistency is more important than severity. Individuals concerned with the guidance of children, but not closely bound to them emotionally, will find that punishment administered in the spirit of a dictator or as a release of aggression will have a harmful rather than beneficial effect upon the personal and social development of the child.

A study conducted by Celler was concerned with the school practices that make for a good disciplinarian in a teacher. A list of thirty-eight practices considered important were drawn up in a rating chart and used in evaluating the practices of eighty-two secondary-school teachers. On the basis of the data obtained from this study, Celler concludes:

1. The practice of using all available equipment and visual aids to embellish and enrich a lesson so as to interest and promote the learning growth of pupils is closely associated with effective discipline.
2. The practice of routinizing various classroom procedures such as the distribution of paper, copying of the assignment, entering or leaving the room, etc., in developing the mechanics of the classroom as well-formed habits is another practice closely associated with effective discipline.
3. The practice of presenting the subject matter in a vital and enthusiastic manner, of making the subject matter appealing to the point that the interest and the enthusiasm catches on enough so that the subject matter itself acts as a check or control to incipient misbehavior is also closely associated with effective discipline.
4. A number of other practices describing skillful techniques of classroom teaching, such as keeping the class moving without idleness, using simple devices, and providing elastic endings are moderately associated with effective discipline.[17]

The weakness of punishment as a means of discipline is that it fails to get at the root of the individual's difficulties.[18] While it may succeed in eliminating the undesirable form of behavior, it does not correct the basic difficulty. For example Tom may be a "show-off" at school. The teacher is advised to ignore Tom when he displays such a form of behavior. Since the basic need which leads Tom to exhibit such forms of behavior has not been considered, any attempt to simply eradicate this form of behavior would likely lead Tom to resort to some form of substitute behavior more acceptable to his teacher. Tom may thus display such behavior under circumstances where the teacher will not be involved. He may find a suitable form of behavior as a substitute which does not come to the attention of his teacher, such as drawing weird figures, daydreaming, lying and deceit, and the like.

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[17] Sidney L. Celler, "Practices Associated with Effective Discipline: A Descriptive Statistical Study of Discipline," *Journal of Experimental Education*, Vol. 19 (1951), pp. 333-358.

[18] See J. C. Foster and J. E. Anderson, *The Young Child and His Parents* (Minneapolis: University of Minnesota Press, 1930).

TEACHER ADJUSTMENT

Since the role of the teacher is extremely important in the guidance of pupils, it is important for teachers to be well adjusted. The teacher may be endowed with an abundance of knowledge, a wide range of skills, and a very complete understanding of the learning process, but be emotionally and socially maladjusted to such an extent that her classroom efforts are largely ineffectual. The teacher who is nervous and socially maladjusted will have a bad effect upon the personal and social development of pupils. There is plenty of evidence for the conclusion that pupils of a friendly, democratic, understanding teacher will tend to display these same general qualities; while the pupils of an unstable, unfriendly, prejudicial teacher will be adversely affected.

Emotional instability. The teacher brings his "life story" to the classroom. The teacher, like the "twig," has been shaped by various conditions and forces of his past. He cannot suddenly discard his past and bring a completely new personality to the classroom. The teacher who has felt the warmth of a good home and pleasant family relations brings a feeling of cheer and a wholesome attitude toward home life to his classroom. The teacher who is given to emotional upsets will, when irritating conditions arise, react accordingly.

There is a common acceptance of the principle that normal emotional adjustment is important for success as a teacher, although not the only important factor. Teacher-training institutions have emphasized the importance of emotional stability, but have not found satisfactory means of ascertaining this in the selections of candidates for teaching. George Retan attempted to study the relation between emotional stability and teaching success.[19] Using 152 teachers, for whom complete data were available as subjects, he secured ratings from the superintendents of their teaching. The ratings presented in Table 20-3 indicate that emotional instability, as measured by present tests, is not conclusive evidence for unfitness for entering teaching. Statements of the superintendents indicated that good teachers may be found among the dominating groups, the unstable groups, the shy groups, as well as among other special groups. There is no one good pattern of traits which secures the excellent teacher. Rather, there appears to be several patterns. Likewise there are many patterns of traits

[19] George A. Retan, "Emotional Instability and Teaching Success," *Journal of Educational Research,* Vol. 37 (1943-44), pp. 135-141.

TABLE 20-3. *A comparison of the ratings given by superintendents to teachers listed as stable with those listed as unstable*

	GOOD TO EXCELLENT PER CENT	FAIR TO POOR PER CENT	TOTAL PER CENT
Emotionally stable	75.8	24.2	48
Emotionally unstable	51.9	48.1	52

which make poor teachers. Emotional instability is most harmful when combined with other factors which adversely affect the educational development of children.

Adjustments of teachers. Individual differences will be found among those going into teaching as well as in other fields of work and service. There is some evidence that the average level of intelligence of teachers is higher today than was the case a decade or more ago. It is, however, regrettable that salaries have often been too low and conditions of work too unfavorable to attract those with high intelligence into the teaching profession. Notwithstanding this, teachers constitute a superior group, emotionally and intellectually. They have had good records in high school, in the great majority of cases, and have completed certain educational requirements essential for their certification for teaching.

Cornell, using a study of 5,000 teachers, reported a number of unfavorable health practices among teachers.[20] There are: insufficient drinking of water, insufficient exercise, insufficient fresh air in their environments, too much use of patent medicines, excess of carbohydrates in their diet, insufficient or interrupted sleep, unfavorable working conditions, inadequate recreation, and too rapid eating.

A study of the personality adjustments of a sampling of secondary school teachers in California did not indicate that teachers varied markedly from comparable population groups.[21] Three measuring instruments were used to gather information from 83 teachers in service in four southern California school districts. These were the *Mental Health Analysis Inventory,* Adult Series, the *Group Rorschach Ink-Blot Test,* and the *Bryan Instrument for the Evaluation of Student Reaction,* Form 2. There was some evidence for two exceptions to the similarity of teachers to comparable population groups. These are: (1) the average teacher may be less emotionally responsive than the average of the general population, and (2) teachers may tend to be somewhat more rigid and more concerned with certain minor details of their life activities and work.

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[20] W. S. Cornell, *Report of the Development of Medical Inspection of Public Schools.* Philadelphia: Board of Public Education, 1933.

[21] Thomas E. Clayton, "The Personality Adjustment of Teachers in Relation to Evaluation by Pupils." Ph.D. Thesis (University of Southern California, 1950).

Importance of good mental hygiene. The physical and mental health of teachers is a vital factor in a sound educational program. The results of the study by Boynton and others, discussed in Chapter 9, revealed that unstable teachers have a harmful effect on the adjustments of the pupils.[22]

In a series of studies conducted at the University of Illinois, it was shown that the classroom personality of the teacher had a definite bearing on the behavior of children.[23] It was further shown that this difference persisted beyond the period of contact with the teacher. Teachers are entrusted with responsibilities of utmost importance. He teaches by example as well as through percepts. The maladjusted teacher will have a detrimental effect upon the lives of a large number of growing boys and girls. In this connection one may consider the major sources of teachers' fears. The following fears are commonly found among teachers:

Fear of being unable to do an acceptable job.
Fear of criticism from parents and other members of the community.
Fear of trying out something new or different.
Fear of not being liked by the pupils.
Fear of not being accepted by other teachers.
Fear of administrative authority.
Fear of loss of job.

An important mental hygiene hazard frequently found among teachers is their negative attitude toward teaching. This attitude may be observed in the reply given by many teachers to the question "What is your field of work?" Then too, teachers frequently complain about their low salaries, the difficulty of working with children or adolescents, the unreasonable demands made upon them by the school authorities or agencies in the community, and restrictions placed upon their activities. A beginning point in a mental hygiene program for teachers would be that of guiding them in the development of a favorable attitude toward teaching as a profession. They should be led to realize the importance of the teacher as *a builder of tomorrow's citizens*, and should furthermore realize that they were not forced into teaching as a profession. Harold Bernard has emphasized the need for teachers to exercise the various facets of personality which are listed as the physical, the mental, the emotional, and the spiritual.[24] He, then, lists certain action patterns which are conducive to the various aspects of personality and to good mental health. While these may be applicable to all adults, they are especially applicable to the teacher and will be listed here for further consideration and study by the reader.

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[22] P. L. Boynton, *et al.*, "The Emotional Stability of Teachers and Pupils," *Journal of Juvenile Research*, Vol. 28 (1934), pp. 223-232.

[23] H. H. Anderson, J. E. Brewer, and Mary F. Reed, *Studies of Teachers Classroom Personalities* (Applied Psychology Monographs, 1946), No. 11.

1. Maintain sound physical health
2. Seek to gain understanding of your own conduct
3. Achieve security through developing skills
4. Seek improved relationships with others
5. Maintain confidential relationships with selected individuals
6. Face stress and strain with poise
7. Substitute planning for worry
8. Give both work and play a place in your life
9. Give attention to the present situation
10. Just do the best you can
11. Capitalize on the mental health value of religion
12. Learn to enjoy living

SUMMARY AND CONCLUSIONS

Each child is faced with a number of development tasks. Some children because of heredity and past experiences have more difficulties in their growth toward maturity than others. It is the task of the teacher to recognize these difficulties and guide these children in making satisfactory adjustments when they are faced with frustrations or conflicts. The meaning of mental health in the classroom involves the way the classroom activities are organized so that each child as a member of the group is able to meet effectively the problems encountered. Those responsible for guiding the growth of children must know the conditions and factors that promote optimal growth. They must further know the general pattern of child development and the unique growth pattern of each individual child. Only then will they be able to determine the needs of the individual child.

The school cannot expect children from diverse backgrounds to develop automatically a sense of belonging to the school groups of which they are a part. Co-operation does not just happen, but develops as a result of experiences in which there are opportunities for co-operative action. Such activities must be guided by teachers who understand children and the operation of group dynamics. A unit of work will not only affect children differently, but its influence upon a particular child will vary with the conditions under which it is experienced.

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[24] By permission from *Mental Hygiene for Classroom Teachers* (Copyright, 1952, McGraw-Hill Book Co., Inc., New York), Chap. XIX.

Delinquent behavior is fostered by an atmosphere of insecurity and rejection. It might be stated as a fundamental principle that every child has the potential of becoming a delinquent. This minority group of children classed as delinquents comes from all races, creeds, and social classes, although some of these conditions are more closely associated with the prevalence of delinquency than others. The school is the one social institution which has contact with all children. It is in a strategic position to meet this problem. The most effective ways in which it can combat delinquent behavior is to accept all the children who enter its doors and provide an atmosphere of security and belongingness for them. Teachers who are well adjusted, who accept the child for what he is and respect his personality, and who attempt to provide an atmosphere where he will feel secure and wanted will be able to combat many unfavorable influences of the home and community.

Questions and Exercises

1. School work is often too easy for the bright child. How is this likely to affect his personal adjustments and habits of work?
2. Describe the characteristics of a wholesome school environment.
3. Give the reasons why each child who presents a problem to the teacher should be studied as an individual case.
4. Recall from your own experiences in elementary school or high school individuals in need of special attention. What factors in the situation, not known by the teacher, would have helped her in dealing with any one of these cases? Show a *case study* would have been helpful to the teacher in dealing with these problems.
5. What is meant by the concept "whole child"? Show how this concept is being utilized in a modern educational program.
6. What materials should be included on a cumulative record to help the teacher in the guidance of the individual child?
7. What are some things a teacher can do so as to provide the best condition for a counseling interview with a pupil?
8. Helen, age nine, is physically handicapped. She is stoop-shouldered and suffers from a heart affliction Although she is repeating grade three, her work is still poor. She rarely speaks to other children or chats with the

teacher. When a remark is addressed to her she hangs her head and mumbles a reply. Occasionally she volunteers a remark in class. She reads rather well, but the peculiar tonal quality of her voice makes her reading so conspicuous that the effort is disturbing. How can this maladjusted child be guided so that she will become a happy member of the group?

9. The mental hygiene practices listed on page 477 are taken from Harold Bernard, *Mental Hygiene for Classroom Teachers,* Chapter 19. Read Bernard's discussion of these and present a detailed class report on them.

Recommended Readings

Cole, L. E., and Bruce, W. F., *Educational Psychology* (Yonkers-on-Hudson: World Book Co., 1950), Chap. XVII.

Cutts, N. E., and Moseley, N., *Practical School Discipline and Mental Hygiene* (Boston: Houghton Mifflin Co., 1941).

Gates, A. I., *et al., Educational Psychology,* 3rd ed. (New York: The Macmillan Co., 1948), Chap. XXI.

Jersild, A. T., *Child Psychology,* 4th ed. (New York: Prentice-Hall, Inc., 1954). Chap. XVI.

Louttit, C. M., *Clinical Psychology,* rev. ed. (New York: Harper and Bros., 1947).

Rivlin, H. N., *Educating for Adjustment* (New York: Appleton-Century-Crofts, Inc., 1936).

Skinner, Chas. E., ed., *Educational Psychology,* 3rd ed. (New York: Prentice-Hall, Inc., 1950). Chaps. XXIII, XXIV and XXV.

Stephens, J. M., *Educational Psychology* (New York: Henry Holt and Co., 1951). Chaps. XX and XXI.

APPENDICES

APPENDIX A

A Selected Annotated Bibliography of 16 mm. Films

CORRELATED WITH THE MATERIALS OF THE VARIOUS CHAPTERS

PART I: GROWTH AND DEVELOPMENT

CHILDREN'S EMOTIONS (*M-H*, 22 min., sd.). The major emotions are illustrated, and the principal characteristics of children's emotions are discussed.

CHILDREN GROWING UP WITH OTHERS (*U W F*, 33 min., sd.). Deals with the problems involved in achieving a balance between the individual self and the cooperative self.

EXPERIMENTAL STUDIES IN THE SOCIAL CLIMATE OF GROUPS (*Iowa*, 31 min., sd.). The picture shows the behavior of individuals resulting from different social climates—democratic, autocratic, and laissez-faire.

FEELING OF REJECTION (*N F B C*, 22 min., sd.). A case history of an emotionally maladjusted woman is given. The influence of early childhood conditions, which contributed to her maladjustments, are clearly presented.

GENESIS OF THE EMOTIONS (*N Y U*, 45 min., sil.). This film is in a series by René Spitz entitled, "Studies of the Psychoanalytic Research Project on Problems of Infancy." Beginning with the two-weeks-old infant the differentiation of the emotions up to the end of the first year is shown.

GROWTH OF MOTOR BEHAVIOR (*E B F*, 15 min., sil.). A general summary of studies conducted at the Yale Laboratories bearing on motor development.

GROWTH: A STUDY OF JOHNNY AND JIMMY (*I F B*, 43 min., sil.). The interdependence of maturation and practice is clearly illustrated in this comparative study of twins, who were the subjects of a special study of this problem.

HEREDITY AND ENVIRONMENT (*C I F*, 10 min., sd.). Examples of the operation of heredity and environment are given. An overview is presented of cultural inheritance, environmental influences, and genetics.

LIFE BEGINS (*E B F*, 60 min., sd.). This furnishes a condensation of the individual child development films and gives an overall view of the studies by Gesell at the Yale Clinic of Child Development. Individual growth patterns for different children are demonstrated.

PREFACE TO LIFE (*W F C*, 29 min., sd.). Through the life story of Michael Thompson the importance of a healthy childhood in a favorable home atmosphere is revealed.

PERCEPTUAL AND MOTOR DEVELOPMENT (*P S C*, 18 min., sil.). This film supplements three previous productions. It continues a boy's growth to show physical and behavioral characteristics at ages 3, 4, and 5 years. The development of motor coordinations is well illustrated.

PRINCIPLES OF DEVELOPMENT (*M-H*, 17 min., sd.). The fundamentals of growth and change are outlined and six basic principles of development presented. The variables which account for individual differences in development are also presented.

SOCIAL DEVELOPMENT (*E B F*, 16 min., sd.). Materials bearing on social development collected over a period of 15 years in Yale University Clinic of Child Development are here shown.

TESTING INTELLIGENCE WITH THE STANFORD-BINET (*P S C*, 18 min., sd.). The method of administering and scoring the Revised Stanford Binet Scale is here shown. The student is given a glimpse of the uses of intelligence test results in teaching and guidance.

PART II: LEARNING AND GUIDANCE

BRIDGES FOR IDEAS (*U S Calif.*, 20 min., sd.). The use and techniques of language, motion pictures, radio and television, and other means of communicating information and ideas are examined and demonstrated.

CHILDREN LEARNING BY EXPERIENCE (*U W F*, 30 min., sd.). The relation between interests, learning, and experiences is here shown.

THE CHILDREN MUST LEARN (*N Y U*, 2 reels, sd.). This film points the way to the necessity of developing learning experiences around problems of daily living.

A CLASS FOR TOMMY (*B F*, 20 min., sd.). The problems of teaching mentally and physically handicapped children are clearly revealed in this film.

IMPORTANCE OF GOALS (*M-H*, 19 min., sd.). The importance of goal-seeking behavior is emphasized through the presentation of an episode in school contrasting the in-school and out-of-school behavior of a teen-age boy.

INDIVIDUAL DIFFERENCES (*M-H*, 23 min., sd.). Roy is different from his older brother who made a good scholastic record at school. The teacher, after successive failures with Roy, comes to understand him and is thus able to deal with him in terms of his abilities and personality characteristics.

MOTIVATING THE CLASS (*M-H*, 19 min., sd.). Bill, a young enthusiastic teacher, at first finds his class bored and restless. Through class motivation he is able to increase interest and learning.

MOTIVATION AND REWARD IN LEARNING (*P S C*, 15 min., sd.). The significance of motivation and reward is illustrated in the learning of albino rats.

PROBLEM CHILDREN (*C O*, 20 min., sd.). This is the story of two school boys, one a shy, withdrawn type, the other an aggressive anti-social type. The story shows how the school may be able to help such problem children.

SHYNESS (*M-H*, 23 min., sd.). A film showing how through a sociometric test a social pattern in the classroom was brought to the attention of the teacher. The observations of three shy children by a clinical psychologist are utilized to reveal the factors in children's lives which contribute to shyness.

YOUTH IN READINESS (*Kan U*, 25 min., sd., color). A balanced curriculum of academic subjects, vocational courses, and extraclass activities is here presented.

WILSON DAM SCHOOL (*A F C*, 21 min., sd.). The daily activities of the pupils at the Wilson Dam School (Ala.) provides considerable opportunity for their growth in social effectiveness as well as in academic achievement.

SOURCES OF THE FILMS USED IN THE APPENDIX

A F C—American Film Center, Brandom Films Inc., 1700 Broadway, New York.

B F—Bailey Films, Inc., Hollywood 28, Calif.

C I F—Coronet Instruction Films, 65 East South Water Street, Chicago, Ill.

C O—Ohio Division of Mental Hygiene, Columbus, Ohio

E B F—Encyclopedia Britannica Films, 20 N. Wacker Dr., Chicago, Ill.

I F B—International Film Bureau, Inc., 57 E. Jackson Blvd., Chicago, Ill.

Iowa—State University of Iowa, Iowa City, Iowa

Kan U—University of Kansas, Bureau of Visual Instruction, Lawrence, Kansas

M-H—McGraw-Hill Book Co., Text Films Department, 330 West 42nd Street, New York 18, N. Y.

N F B C—National Film Board of Canada, 1270 Avenue of the Americas, New York, N. Y.

N Y U—New York University Film Library, 26 Washington Place, New York

P S C—Pennsylvania State College, Psychological Cinema Register, State College, Penn.

W F C—World Films Inc. (Castle Films), 1445 Park Avenue, New York

U S Calif—University of Southern California, Los Angeles, Calif.

U W F—United World Films, Inc., 105 East 10th Street, New York

APPENDIX B

Basic Statistical Concepts

STATISTICS are used in psychology for two reasons—to summarize and describe data (descriptive statistics) and to interpret data so as to predict consequent data (statistical inference). For example, there are statistics available on the number of people killed in automobile accidents on the Fourth of July since the beginning of automobile transportation. The data are described in tables, graphs, and distribution charts. These are descriptive statistics. Then, from the careful interpretation of these data by statistical inference techniques, the probability that a certain number will be killed on July 4, 195– can be predicted with a known degree of probability. Statistical procedure is used to describe data so that events that have happened can be better undersood, and it is also used to interpret data so that events that have *not* happened can be predicted with a calculated probable error.

The following pages will describe and illustrate the more basic statistical procedures in a most abbreviated manner. Students who have had a course in statistics will find this review to be useful as a refresher to dormant learning. Students who have not had a course in statistics can, by rereading and tutorial assistance, gain a comprehension adequate to read intelligently such reported research as appears in the preceding chapters of this book.

THE MEAN OR AVERAGE

A single individual datum needs no statistical treatment. "John is in the 6th grade and made a score of 52 on a spelling test"—is as simply and clearly stated as possible. Numerous data, however, are not so simple and clear unless they are given some sort of statistical treatment. With John in the 6th grade are 9 other children whose scores on the spelling test were as follows—46, 55, 58, 48, 54, 53, 52, 58, 54. (See column 1 in Table A-1.) Now, in order to understand John's score in relation to the others it is necessary to do some statistical calculating. Even the 6th graders themselves can add all the scores together and divide by the number of scores, or 10, to find the *average* score. In statistical terminology the average is called the *mean* or a measure of the *central tendency*.

DEVIATIONS. If the mean spelling score in the 6th grade is 53 and John's score is 52, he is then one score point below the mean. This is called his *deviation*. If we subtract the scores of all the children from the mean, regardless of whether they are minus or plus deviations, we can then add them and again divide by 10 to find the *mean deviation*. Since this is found to be 2.8 score points (see column 2, Table A-1), we can conclude that John's spelling score is closer to the average than most of the other pupils in the class.

In statistics, however, it is customary to use a more stable deviation index called the *standard deviation* or "the sigma." It is calculated by squaring each deviation, adding the squares together, dividing by the number of scores, and taking the squareroot of this quotient. This was found to be 3.6 for the spelling test scores. (See column 3 in Table A-1).

A mean deviation is always smaller than a standard deviation. When extended above and below the mean score in a normal distribution, 57.5 per cent of the cases are included by the mean deviation and 68.26 per cent by the standard deviation. In other words, one mean deviation extends from the mean score (the 50th percentile) down to the 21st percentile and up to the 79th percentile, while one standard deviation extends from the mean score down to the 16th percentile and up to the 84th percentile.

RELIABILITY OF MEASURES. The ten spelling scores listed above represent a very small sample of 6th graders in the whole city. The question arises—How typical are these scores of 6th graders in general? What would the mean spelling score be if a much larger number of 6th graders were tested? How reliable is our mean of 53? The reliability of a mean is determined by calculating its *standard error*. This is done by dividing the standard deviation (3.6) by the square root of the number of cases less one ($\sqrt{10-1} = 3$). This is 1.2 for the spelling scores ($3.6 \div 3 = 1.2$), which means that the chances are (68 in 100) that the mean for a larger sample (called the true mean) is within the limits of 1.2 higher or lower than our obtained mean of 53. In other words the true mean (or the mean for a large number of children) is probably between 51.8 and 54.2 (which is written 53 ± 1.2).

COMPARING TWO LISTS OF MEASUREMENTS

The ten 6th grade children, whose spelling test scores are listed above, were given a second test three weeks after the first one. The scores made on the second test were — 64, 50, 64, 75, 60, 63, 72, 66, 86, 70. (See column 6 in Table A-1). The mean score was found to be 67, the mean deviation was 7, the standard deviation was 9.1, and the standard error of the mean was 3. Now, how do the scores the children made on the second test *compare* with the scores they made on the first test?

There are two statistics that may be used to compare groups of data—the coefficient of correlation (a measurement of likeness) and the significance of the difference between the means.

THE COEFFICIENT OF CORRELATION. When the scores on two series of data are paired, as are those in our two spelling tests, it is possible to calculate the degree of covariance, or the statistical relationship, between the two. If all the children who took the two tests made the same relative scores on both, the coefficient of correlation will be high. But if those who made high scores on the first test made low scores on the second test, the coefficient of correlation will also be high but reversed or negative. A perfect positive relationship is indicated by a correlation of 1.00, a perfect reversed or negative relationship is indicated by — 1.00 and no relationship at all, or chance, in indicated by .00.

The coefficient of correlation between the two spelling tests we have been discussing is .87 with a probable error of .055. (See Table A-1). This means that the relationship is fairly high and cross predictions can be made with 50 per cent better than chance certainty.[1] In other words, if we know a score made on test 1 we can then predict what score the same pupil will make on test 2 within certain error limits. Table A-1 shows such a calculation. Assuming that a pupil makes a score of 51 on test 1, it can be predicted by calculation that he will make a score of 62.6 on test 2. (See Table A-1.) However, since the coefficient of correlation between the two tests is not perfect (neither 1.00 nor — 1.00), there is a standard error in this prediction of 4.5 score points. This means that if the pupil actually takes test 2, there are 68 chances in 100 that he will make a score between 58 and 67 (62.4 ± 4.5) or the predicted score plus or minus its standard error.

THE SIGNIFICANCE OF A DIFFERENCE. The mean score the children made on the first spelling test was 53 while that on the second test was 67. This indicates an average improvement of 14 test points. How much of this improvement is due to chance? A statistical procedure, called the critical ratio, indicates the degree to which a difference between two *means* is due to chance. This is called the statistical significance of a difference. It is the ratio of a difference between two means and the standard error of that difference. The greater the ratio, the greater the significance of the difference, or the less likelihood that the difference is due to chance.

The significance of a ratio of the difference between two means and the standard error of that difference is usually interpreted at two levels of significance, or amount of chance—the 5 per cent level and the 1 per cent level. A ratio of 2.58 or higher is said to be significant at the 1 per cent level, while one between 1.96 and 2.58 is said to be significant at the 5 per cent level of confidence. If more than 5 per cent chance is indicated (ratios less than 1.96), the difference is not considered to be statistically significant.[2]

Now, if we divide difference between the mean scores on the first spelling test and the second spelling test, by the standard error of that difference, we will then know the degree to which the difference is due to chance.

---

[1] The superiority (in per cent) of any coefficient of correlation over chance is calculated by subtracting from 1 the square root of 1 minus the correlation squared. The formula is $1 - \sqrt{1 - r^2}$.

[2] This varies somewhat for numbers less than 100. The ratio necessary for the 1 per cent level of probability with only 10 cases is 3.25 and that for the 5 per cent level is 2.26. Probability tables for various numbers or "degrees of freedom" are given in any standard statistics textbook.

Since the means in our illustration are not independent of each other (they are both measurements of the same children), they are said to be correlated. The procedure for calculating the significance of their difference is somewhat more complicated than that for calculating the difference between uncorrelated or independent means. The standard error of the difference between correlated means is the square root of the following quantity—the square of the standard error of the mean of test 1, plus the square of the standard error of the mean of test 2, minus twice the correlation between the two tests times the standard error of the mean of test 1 times the standard error of the mean of test 2. The formula is:

$$SE_d = \sqrt{\sigma_{m1}^2 + \sigma_{m2}^2 - 2r_{12}\sigma_{m1}\sigma_{m2}}$$

Substituting the data of our illustration we have:

$$SE_d = \sqrt{1.44 + 9 - 1.74 \times 1.2 \times 3)} = 2.04$$

Now if we divide the difference between our means by this standard error of that difference we get a critical ratio of 6.8 (14 ÷ 2.04 = 6.8) which is significant at the 1 per cent level. There is less than one chance in 100 that the difference between these means is not a true one.

The significance of the difference between two uncorrelated or independent means is more easily calculated. The standard error of the difference is obtained by taking the square root of the sum of the squares of the standard errors of the two means. The standard error of the mean test 1 was 1.2, which squared would be 1.44. The standard error of the mean of test 2 was 3, which squared would be 9. The sum of these would be 10.44 and the square root would be 3.23. The difference between the means (14) divided by this standard error of that difference would be 4.3, which is also significant at the one per cent level of confidence.

TABLE A-1. *Illustrative Statistical Calculations*

	TEST 1 ($_x$)			TEST 2 ($_y$)			
	1 SCORE	2 d_x	3 d_x^2	4 SCORE	5 d_y	6 d_y^2	7 $d_x \cdot d_y$
John	52	−1	1	64	−3	9	3
Bill	46	−7	49	50	−17	289	119
James	55	2	4	64	−3	9	−6
Janet	58	5	25	75	8	64	40
Elizabeth	48	−5	25	60	−7	49	35
George	54	1	1	63	−4	16	−4
Tom	53	0	0	72	5	25	0
Sam	52	−1	1	66	−1	1	1
Sarah	58	5	25	86	19	361	95
Mary	54	1	1	70	3	9	3
Totals	530	28	132	670	70	832	286

1. $M_x = 530 \div 10 = 53$ $\quad M_y = 670 \div 10 = 67$ $\quad \left(\frac{\Sigma\,\text{Sc}}{N}\right)$

2. $AD_x = 28 \div 10 = 2.8$ $\quad AD_y = 70 \div 10 = 7$ $\quad \left(\frac{\Sigma\,d}{N}\right)$

3. $SD_x = \sqrt{132 \div 10} = 3.6$ $\quad SD_y = \sqrt{832 \div 10} = 9.1$ $\quad \left(\sqrt{\frac{\Sigma\,d^2}{N}}\right)$

4. $SE_{mx} = 3.6 \div 3 = 1.2$ $\quad SE_{my} = 9.1 \div 3 = 3$ $\quad \left(\frac{SD}{\sqrt{N-1}}\right)$

5. $M_x - M_y = 67 - 53 = 14$ $SE_{m-m} = \sqrt{(1.2)^2 + (3)^2} = 3.23$ $\quad (\sqrt{SE_{mx}{}^2 + SE_{my}{}^2})$

6. $r = \frac{286}{10(3.6 \times 9.1)} = .87$ $\quad \left(\frac{\Sigma\,d_x \cdot d_y}{N(SD_x \cdot SD_y)}\right)$

   $PE_r = \frac{.6745\ (1 - .757)}{\sqrt{10 - 1}} = .055$ $\quad \left(\frac{.6745(1 - r^2)}{\sqrt{N - 1}}\right)$

7. $SE_{mx-my} = \sqrt{1.44 + 9 - 6.26} = 2.04$ $\quad (\sqrt{SE_{mx}{}^2 + SE_{my}{}^2 - 2r_{xy} \cdot SE_{mx} \cdot SE_{my}})$

8. Test 2 score predicted from score of 51 on test 1.

   $.87(9.1 \div 3.6)(51 - 53) + 67 = 62.6$ $\quad (y = r\,\frac{SD_y}{SD_x}\,(X - M_x) + M_y$

   $SE_{est} = 9.1\sqrt{1 - .757} = 4.5$ $\quad (SD_y\,\sqrt{1 - r^2})$

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